Northern States Power Company – Wisconsin

Joint Application for a Certificate of Public Convenience and Necessity

Ashland-Ironwood Transmission Line Relocation Project

To be Located in Ashland and Iron Counties, Wisconsin

PSC Docket No. 4220-CE-183

Submitted to the Public Service Commission of Wisconsin and the Wisconsin Department of Natural Resources

May 26, 2021

Xcel Energy®

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Acronyms and Abbreviations

ACSR	aluminum conductor steel reinforced
AEA	Agricultural Enterprise Area
AIS	Agricultural Impact Statement
AM	AM Transmitter Stations
Applicant	Xcel Energy
Application	Joint Application to the PSC and WDNR for Certificate of Public Convenience and Necessity
ASNRI	Areas of Special Natural Resource Interest
ATV	all-terrain vehicle
Bad River Band	Bad River Band of Lake Superior Chippewa Indians
BIA	Bureau of Indian Affairs
BMPs	Best Management Practices
CPCN	Certificate of Public Convenience and Necessity
CN	Canadian National Railway
CWA	Clean Water Act
DATCP	Department of Agriculture, Trade and Consumer Protection
DPC	Dairyland Power Cooperative
EMF	Electric and Magnetic Fields
ER	Endangered Resources
FAA	Federal Aviation Administration
FCL	Forest Crop Law
FM	FM Transmitter Stations
FPP	Farmland Preservation Program
GAP	Gap Analysis Project
GIS	Geographic Information System
kcmil	thousands of circular mils
kV	Kilovolt
kV/m	Kilovolts Per Meter
LSDP	Lake Superior District Power
Merjent	Merjent, Inc.
MF	Magnetic Field
MFL	Managed Forest Law
mG	MilliGauss
MISO	Midcontinent Independent System Operator, Inc.
MTEP	MISO Transmission Expansion Planning
MW	Megawatt
NESC	National Electric Safety Code
NHCP	Natural Heritage Conservation Program
NHI	Natural Heritage Inventory
NNG	Northern Natural Gas

NPS	U.S. Department of the Interior - National Park Service
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High Water Mark
OPGW	fiber optical ground wire
ORW	Outstanding Resource Water
Project	Ashland-Ironwood Transmission Line Relocation Project
PSC or Commission	Public Service Commission of Wisconsin
PSS®E	Power System Simulator for Engineering
ROW	Right-Of-Way
TCSB	Temporary Clear Span Bridge
TP	Twisted Pair
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTV	utility task vehicle
WDNR	Wisconsin Department of Natural Resources
WHS	Wisconsin Historical Society
WisDOT	Wisconsin Department of Transportation
WWI	Wisconsin Wetland Inventory
Xcel Energy	Northern States Power Company, a Wisconsin corporation

EXECUTIVE SUMMARY

Introduction

Northern States Power Company, dba Xcel Energy (Xcel Energy or Applicant), is proposing to relocate and rebuild two existing transmission lines that run between Xcel Energy's Gingles Substation southeast of Ashland, Wisconsin and its Ironwood Substation in Ironwood, Michigan. Line W3351 is 88 kilovolt (kV) and line W3316 is 115 kV (Transmission Lines). Each line is approximately 35 miles long and is located within the reservation of the Bad River Band of Lake Superior Chippewa Indians (Bad River Band).

The Project requires a Certificate of Public Convenience (CPCN) from the Public Service Commission of Wisconsin (PSC or Commission) and for permit authorization to discharge dredged and/or filled materials into wetlands and place temporary bridges across navigable waters from the Wisconsin Department of Natural Resources (WDNR). In this joint application to the PSC and WDNR, Xcel Energy is seeking authorization from the PSC and WDNR to construct the new 88 kV and 115 kV facilities as described below.

The Application contains five route alternatives, identified as Route Options A, B, C, D and E. All five route options contemplate relocating and rebuilding the 88 kV W3351 and 115 kV W3316 lines along the 34.5 kV W3606 and 34.5 kV W3607 corridors. The W3606 and W3607 lines are in poor condition and will be rebuilt as part of the proposed project. A segment of the W3606 line will also be relocated as part of the project. This summary provides an overview of the proposal and identifies where detailed information can be found in the Application.

Proposed Facilities

The Applicant proposes constructing and placing into operation the following facilities:[1]

1. For all five route options, relocate and remove approximately 27 miles of the existing single circuit 88 kV W3351 transmission line between Structure 33 on the southeast side of Ashland and Structure 255 at the Saxon Pumping Station Tap.

2. For all five route options, rebuild, in the existing corridor, approximately 2 miles of the existing single circuit 88 kV W3351 transmission line between Structure 315 on the west side of Hurley and Structure 336 at the Ironwood Substation.

3. For all five route options, relocate and remove approximately 32 miles of the existing single circuit 115 kV W3316 transmission line between Structure 43 on the southeast side of Ashland and Structure 255 on the west side of Hurley.

[1] Xcel Energy is also building a new 115 kV line within an existing 34.5 kV corridor between the Hurley and Norrie substations for system reliability. This project, which does not require Commission approval, is expected to be complete prior to the commencement of construction for the Project proposed in this application.

4. Rebuild in the existing corridor, depending on final route, approximately 2 miles of the existing single circuit 115 kV W3316 transmission line between Structure 256 located west of Hurley and Structure 270 at the Ironwood Substation.

5. Rebuild, depending on final route, approximately 17 miles of the existing single circuit 34.5 kV W3606 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 169 located southeast of Ashland and Structure 440 located east of Golf Course Road north of Mellen.

6. For all five route options, relocate and remove approximately 3.4 miles of the existing single circuit 34.5 kV W3606 transmission line between Structure 441 located east of Golf Course Road north of Mellen and Structure 495 within the Mellen City limits.

7. If Route Options A, B, or C are selected, rebuild approximately 0.5 miles of the existing single circuit 34.5 kV W3606 transmission line to double circuit 115/69 kV or single circuit 69 kV between Structures 496 and 503 within the Mellen City limits.

8. Rebuild, depending on final route, approximately 26 miles of the existing single circuit 34.5 kV W3607 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 34 located within the Mellen City limits and Structure 463 at the Ironwood Substation. [2]

Purpose and Necessity

The Project needed to ensure reliable electric service to the Bayfield, Ashland, and Ironwood areas. The transmission system in the area currently serves approximately 40 megawatts (MW) of peak load. Xcel Energy, as the retail service provider, serves approximately 75 percent of the area's residential, commercial and industrial customers. The remaining 25 percent of customers are served by Bayfield Electric Cooperative. The reliability concerns are created by three factors:

1. Difficult terrain that constrains access to the facilities which are located remote from roads;

2. The advanced age and poor condition of the existing facilities; and

3. Limited land rights across the reservation of the Bad River Band (Bad River Reservation).

The Project will address all reliability concerns and increase load serving capability in the area to meet anticipated customer needs through the mid-century.

Xcel Energy's Transmission Planning Study is contained in Section 2 and Appendix D.

[2] Approximately 0.4 mile of the W3351 line and 0.4 mile of the W3316 line rebuild will be located in Michigan.

Access

The existing lines are located, in substantial part, in areas away from roads and other means of access. Their remoteness complicates maintenance of the line and delays repairs. The area also has difficult terrain, including large wetland complexes, beaver ponds, rock outcroppings, rivers, bogs that do not freeze and steep rugged topography.

As a result, Xcel Energy has had to use non-standard maintenance and vegetation management techniques. For example, there are locations where Xcel Energy is unable to access by vehicle and crews have had to use canoes and boats to reach the transmission line poles. This atypical means of access creates safety concerns.

In addition, Xcel Energy must also comply with the Band River Band's requirements for conducting maintenance work on the transmission lines. This has resulted in sometimes unpredictable access timing and additional obligations regarding invasive species monitoring and equipment and vehicle inspections for each entry on the reservation.

Age and Condition

Line W3351, 88 kV, constructed in 1952, is nearly 70 years old. The structures are H-frame, wood poles. While today's standard is for all new lines to be built with shield wire(s) to protect the structures, W3351 does not have any shield wires. As a result, the poletops, crossarms, and insulators have sustained a significant amount of lightning damage. The majority of the poles are either trussed or deteriorating from natural weathering or animal damage. Latest reports show that 258 of the 336 structures of W3351 have recordable pole defects. Furthermore, this line had

low wire to ground clearance issues that had to be mitigated by installing steel phase raisers in the last 3 years. However, even with this mitigation effort, the line capacity had to be de-rated from a limit of 56MVA down to 50MVA.

Line W3316, 115 kV, constructed in 1976, is 45 years old. The structures are H-frame, wood poles and include dual shield wires. The damages to W3316 are less than to W3351 due to the presence of the shield wires, but poles have sustained lightning damage to insulators and cross arms. While they are also worn from weather and animals, with reports showing 214 of 270 structures with reportable pole defects. While this number of defect poles is high, most are of moderate to low severity and are expected for a line of this vintage in this location. Xcel Energy estimates that within the next eight to ten years W3316 would require a partial refurbishment to replace poles, crossarms and insulators that have reached their end of life. This refurbishment would extend W3316's service life by approximately 15 years (from 50 years to 65 years) until the early-mid 2040s when a complete rebuild would be necessary.

The damaged poles will continue to decay and will lead to increased unplanned, reactive maintenance in the years between scheduled patrolling and testing. Due to the previously described access challenges any unplanned repairs or outages can take additional time to restore. Figures ES-1, ES-2, and ES-3 below show the type of damaged poles on the Transmission Lines.

Figure ES-1 Lightning Damage on Cross Arm

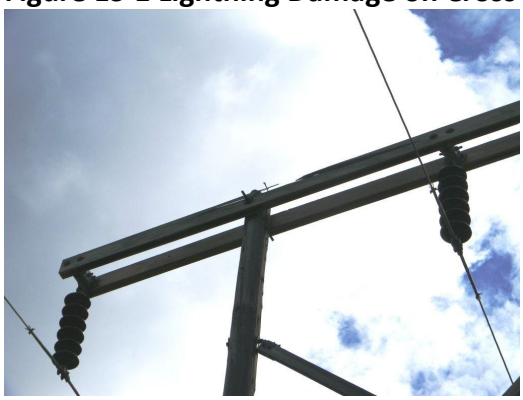


Figure ES-2 Decay on Cross Arm

Figure ES-3 Pole Rot Below Ground and Bear Damage Above Ground

Line W3606, 34.5 kV, constructed in 1979, is 42 years old. The structures are single, triangular configured, wood poles with a shield wire. 2020 pole testing results show wood poles are beginning to deteriorate more rapidly with a 6% failure rate. For reference, a failure rate of 2-3% is considered average. As a result of pole testing Xcel Energy will reinforce or replace defective poles to ensure safety and reliability. Similar to line W3316, this line will also require refurbishment in the next eight to ten years, replacing existing porcelain bell insulators and fiberglass epoxirod arms with polymer horizontal post insulator units. A complete rebuild would also likely be required in the early-mid 2040s but may be accelerated pending W3606s results from Xcel Energy's year 2032 pole testing cycle. If the rejection rates continue to be high, Xcel Energy will evaluate the need to advance the complete reconstruction of this line.

Line W3607, 34.5 kV, constructed in 1949, is 72 years old. These structures are also single, triangular configure, wood poles without a shield wire. This line has already been identified for

complete reconstruction with 9.6 miles already replaced in 2013. Approximately 17 miles of the original 1949 vintage line remains. In recent years, construction has been deferred to coordinate with this proposed project. Xcel Energy continues to monitor and maintain this line to ensure safe and reliable service.

Land Rights

The W3351 and W3316 cross land within the reservation of the Bad River Band. Xcel Energy must, therefore, have approval from the Bad River Band and the Bureau of Indian Affairs (BIA) and pay for easement rights to operate the facilities in their current locations. There are also additional access fees the Bad River Band imposes for maintaining transmission lines on tribal property.

The 50-year grant of easement from the BIA granted for W3351 expired in 2002. Xcel Energy has been working with the Bad River Band and BIA since 2010 to address the expired permit for W3351 and is also negotiating easement terms for the W3316 line.

For W3351, Xcel Energy has paid the Tribe $1.5 million in 2021 for a surcharge fee and $90K in 2020 for property taxes. Xcel Energy is seeking rights to maintain and operate the W3351 through project completion or 2032 and will incur additional property taxes and annual right of way charges.

For W3316, depending on the outcome of negotiations, Xcel Energy may incur additional costs for maintaining the line on Tribal land.

The discussions with the Bad River Band are ongoing and it is uncertain when the land rights issues will be fully resolved.

Load Serving Capability

The Transmission Planning Study assessed the potential load serving capabilities of three options that would address the existing reliability issues caused by the advanced age and poor condition of the 88 kV W3351 and 115 kV W3316 transmission lines, constrained access and limited land rights. The study concluded that the Project has the potential to increase load serving capability in the Bayfield, Ashland, and Ironwood areas by 34 MW, which will meet the anticipated peak load in these areas for decades to come.

Proposed Routes

Xcel Energy proposes removing and relocating the following lines:

- 115 kV W3316 between Structures 42 and 255, approximately 32 miles between Ashland and the west side of Hurley.

- 88 kV W3351 between Structures 33 and 255, approximately 27 miles between Ashland and the Saxon Pumping Station located east of Saxon.
- 34.5 kV W3606 between Structures 441 and 495 (or 503 depending on which route is selected), approximately 3.4 miles of 34.5 kV transmission line located immediately north of the Mellen city limits; 1.8 miles of which is within the Copper Falls State Park. The poles of Structures 466 to 495 (or 503, depending on route option) would be modified to remove the 34.5 kV circuit at the top of the structures. After the top is removed, the pole would continue to carry the existing distribution line that serves the Copper Falls State Park. The remaining poles would be approximately 35 feet tall.

Xcel Energy has developed five potential routes for the rebuild and relocation of lines W3351, W3316, and W3606, all of which begin at Structure W3316-42 southeast of Ashland and terminate at the Ironwood Substation (in Ironwood, Michigan). For purposes of this Application, the termination of the routes is the state boundary (approximately 0.4 mile of the W3351 line and 0.4 mile of the W3316 line rebuild will be located in Michigan)[3]. All five routes generally follow State Highways 13 and 77 and existing 34.5 kV lines W3606 and W3607 with different routing amongst voltage configurations and around townships and cities. The five routes are generally described below:

- Route Option A generally follows the existing 100-foot wide ROW along W3606 and W3607 corridors between Structure W3316-42 (Ashland) and Structure W3316-255 (Hurley) with new ROW corridors along roads such as Van De Bruggen Road (Marengo), County Road C (Highbridge), Golf Course Road (Mellen), Kokogen Road (Gile) and Odanah Road (Hurley). New ROW corridors along Van De Bruggen Road would be built with double circuit 161/69 kV, County Highway C would be built with double circuit 115/69 kV pole structures, Golf Course Road would be built with two paralleling lines of double circuit 115/69 kV and single circuit 161 kV, Kokogan Road would be built with single circuit 161 kV, and Odanah Road would be built with a single circuit 161 kV with distribution underbuilt.
- Route Option B follows the existing 100-foot wide ROW along W3606 and W3607 corridors between Structure W3316-42 (Ashland) and Structure W3316-255 (Hurley) with new ROW areas such as along State Highways 13 and 77 south side and Van De Bruggen Road (Marengo). New ROW corridors along State Highway 13 would be built with single circuit 161 kV, State Highway 77 south side would be built with double circuit 161/69 kV, and Van De Bruggen Road would be built with double circuit 161/115 kV.
- Route Option C uses new ROW along the existing 34.5 kV line corridor, as much as possible. It follows the existing 100-foot wide ROW along W3606 and W3607 corridors with different configurations than Route A around Marengo, Highbridge, Gile, and Hurley including new ROW areas such as Lohman Road and Poor Farm Road (both near Highbridge), Golf Course Road (Mellen) and State Highway 13 north of Mellen. New ROW

[3] There are no State of Michigan regulatory requirements associated with the Project.

corridors along Lohman Road and Poor Farm Road would be built with double circuit 115/69 kV, Golf Course Road would be built with single circuit 161 kV and State Highway 13 near Mellen would be built with double circuit 115/69 kV.

- Route Option D is a blended option of Routes A and C with local modifications north of Highbridge, northeast of Mellen, and in Upson. It follows the existing 100-foot wide ROW along W3606 and W3607 corridors with different configurations than Routes A and C around Highbridge, Mellen, Upson, Gile, and Hurley including new ROW areas. New ROW corridors along Van De Bruggen Road would be built with double circuit 161/69 kV, whereas County Highway C, Delafield Road, and Seaquist Road would be built with double circuit 115/69 kV, Golf Course Road would be built with single circuit 161 kV, State Highway 13 would be built with double circuit 115/69 kV, greenfield areas north and east of Mellen city limits would have two paralleling lines of single circuit 161 kV and double circuit 115/69 kV, Sessions Avenue in Upson would be single circuit 69 kV with distribution underbuild.
- Route Option E is similar to Route Option D except it is offset from the existing W3606 corridor to avoid any transmission line ROW overlap with railroad ROW. New ROW areas include Van De Bruggen Road (Marengo), County Highway C, Lohman Road, Poor Farm Road (all near Highbridge), Golf Course Road (Mellen), State Highway 13 north of Mellen, greenfield areas north and east of Mellen city limits near a future Enbridge pipeline and existing Northern Natural Gas pipeline, northeast of the East Mellen Substation to State Highway 77, and Odanah Road along an abandoned 34.5 kV corridor.

All five routes include the removal of 1.8 miles of the single circuit 34.5 kV W3606 line within Copper Falls State Park. Furthermore, regardless of the route option selected, approximately 1.6 miles of the single circuit 34.5 kV W3606 line between existing Structures 441 and 465 will be removed. Approximately 1.8 miles of the single circuit 34.5 kV W3606 line with distribution underbuild between existing Structures 466 and 495 will be modified to distribution-only structures by removing the 34.5 kV top circuit on a 0.7-mile segment within the Copper Falls State Park.

Routes D and E will modify an additional 0.5-mile of single-circuit 34.5 kV line W3606 with distribution underbuild between existing structure numbers 496 to 503; the 34.5 kV top circuit will be removed and the distribution underbuild will remain.

Route Development

Xcel Energy identified general potential route corridors between established end points meeting the routing priorities defined in Wis. Stat. § 1.12(6). To develop the five routes, Xcel Energy utilized a stepwise process which included consultation with the PSC, the WDNR, the Bad River Band, WisDOT, Enbridge Energy, and the CN railroad. The Company also relied heavily on the public participation process as described in Section 7.0, and the transmission line siting priorities established by the state of Wisconsin (see Section 5.1.3).

During initial route development Xcel Energy looked at multiple routes and route segment options for the new transmission lines. Because of the steep terrain and the number of streams and rivers throughout much of the Project area there are few existing linear corridors to follow between the Gingles and Ironwood substations. Some routes were considered early in the process but were eliminated prior to conducting detailed analysis because desktop analysis identified less impacting route alternatives. Xcel Energy used desktop mapping with available geographic data of environmental and infrastructure features as well as aerial photos to develop and evaluate initial routes. Field reviews were also conducted to better understand on the ground conditions for some of these routes. Appendix I provides a table that describes each route and route segment evaluated and the reason why it was not selected to include in this Application.

After evaluation of all of the options described above and shown in Appendix A, Figure 3 Xcel Energy selected the five routes as proposed route alternatives.

Project Cost

Estimated Project costs reflect total project cost for each of the five route options and associated costs for portions of the Project to be completed in Wisconsin and Michigan. Project costs include: installation and removal costs of transmission lines and distribution costs; substation upgrades; precertification costs, contingency reserve, and Allowance for Funds Used During Construction. Project costs identified are in 2021 dollars and includes an average of 2.4% escalation for anticipated costs when installation is complete in 2026 and removals complete in 2028.

Estimated costs for construction of new lines and the removal of existing facilities are based on Xcel Energy historical data for similar 161 kV, 115 kV, 69 kV transmission and distribution projects. The development of project cost estimates also included on-the-ground site visits of the route alternatives with representatives from civil and line construction, vegetation management, siting and land rights, engineering and project management, as well as desktop reviews.

For the estimate, Xcel Energy identified key known factors that could result in additional costs as well as consideration of factors that are not currently known. The Project will involve constructing three separate transmission lines of approximately 50 miles over a longer than typical duration—from construction of new lines, removal of old lines and restoration, could take up to eight years and the removals will require coordination with the Bad River Band. Estimated project costs therefore, includes contingency reserve for cost as impacts due to weather; unknown subsurface soil/rock conditions; possible alignment alterations; railroad license agreement negotiations; market factors that affect material price and delivery; and restoration of disturbed areas due to construction of new transmission lines and removal of existing transmission lines.

Regulatory Approvals

In this Joint Application, Xcel Energy is seeking a CPCN from the Commission and permit authorization from the WDNR to discharge dredged and/or filled materials into wetlands and place temporary bridges across navigable waters.

The Project also will require approvals and permits from federal and state agencies and local units of government. A list of these permits is contained in Section 1.6.

Conclusion

Based on the material included and referenced in this Joint Application and any subsequent material requested by the PSC or WDNR related to this Joint Application, Xcel Energy requests that the PSC issue a CPCN and any other approvals necessary, authorizing the construction of the Project and associated facilities along one of the proposed routes. Xcel Energy also requests that WDNR issue all the permits and authorizations that may be required to construct the transmission facilities in the manner described in this Joint Application within 30 days after PSC issues its written order on the CPCN Application.

JOINT APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

This Joint Application for the Ashland-Ironwood Transmission Line Relocation Project has been prepared in accordance with the Public Service Commission of Wisconsin (PSC or Commission) and Wisconsin Department of Natural Resources (WDNR) *Application Filing Requirements for Transmission Line Projects in Wisconsin*, Version October 2017 (Transmission Application Filing Requirements).

1.0 PROJECT OVERVIEW

1.1 Identify the owners and investors of the proposed project including their names, addresses, and percent of ownership (Wis. Admin. Code § PSC 111.55(6)).

Northern States Power Company, a Wisconsin corporation
1414 West Hamilton Avenue, PO Box 8
Eau Claire, Wisconsin 54702

Northern States Power Company, a Wisconsin corporation (Xcel Energy or Applicant), is a Wisconsin corporation and a vertically integrated public utility that provides electric generation, transmission, and distribution services in Wisconsin (including the Ashland and Ironwood areas). Xcel Energy is obligated to provide adequate and reliable energy service that meets the needs of its customers. The facilities proposed for construction will be owned solely by Xcel Energy. Once constructed, Xcel Energy will perform the day-to-day operation of the facilities.

1.2 Provide contractual agreements between developer and utilities to construct, finance, lease, use or own transmission facilities.

Xcel Energy has not entered into any contracts with any developer to construct, finance, lease, use, or own the proposed transmission facilities.

1.3 Describe the location of the proposed project and its end points.[4]

Xcel Energy proposes the following:

1. For all five route options, relocate and remove approximately 27 miles of the existing single circuit 88 kV W3351 transmission line between Structure 33 on the southeast side of Ashland and Structure 255 at the Saxon Pumping Station Tap.

[4] W3606 Structures 3002, 3003, 3004, 3005, 3006, and 3007 are were built in 2012 as a radial tie into the new East Mellen Substation and are not proposed to be rebuilt for this Project.

2. For all five route options, rebuild, in the existing corridor, approximately 2 miles of the existing single circuit 88 kV W3351 transmission line between Structure 315 on the west side of Hurley and Structure 336 at the Ironwood Substation.

3. For all five route options, relocate and remove approximately 32 miles of the existing single circuit 115 kV W3316 transmission line between Structure 43 on the southeast side of Ashland and Structure 255 on the west side of Hurley.

4. Rebuild in the existing corridor, depending on final route, approximately 2 miles of the existing single circuit 115 kV W3316 transmission line between Structure 256 located west of Hurley and Structure 270 at the Ironwood Substation.

5. Rebuild, depending on final route, approximately 17 miles of the existing single circuit 34.5 kV W3606 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 169 located southeast of Ashland and Structure 440 located east of Golf Course Road north of Mellen.

6. For all five route options, relocate and remove approximately 3.4 miles of the existing single circuit 34.5 kV W3606 transmission line between Structure 441 located east of Golf Course Road north of Mellen and Structure 495 within the Mellen City limits.

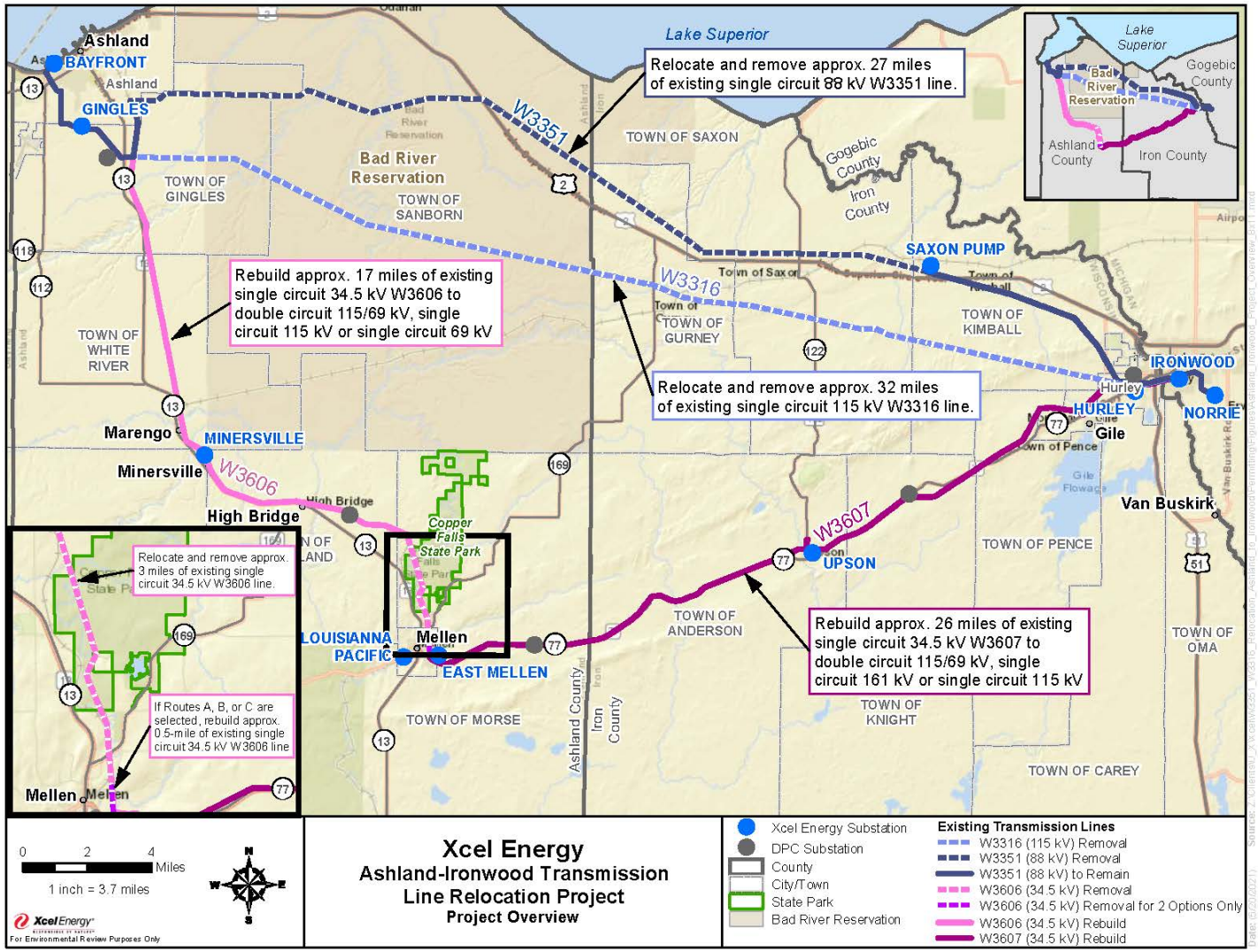
7. If Route Options A, B, or C are selected, rebuild approximately 0.5 miles of the existing single circuit 34.5 kV W3606 transmission line to double circuit 115/69 kV or single circuit 69 kV between Structures 496 and 503 within the Mellen City limits.

8. Rebuild, depending on final route, approximately 26 miles of the existing single circuit 34.5 kV W3607 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 34 located within the Mellen City limits and Structure 463 at the Ironwood Substation. [5]

Figure 1.3-1 depicts the above components of the Project.

[5] Approximately 0.4 mile of the W3351 line and 0.4 mile of the W3316 line rebuild will be located in Michigan.

Figure 1.3-1 Proposed Project Components



As shown in Figure 1.3-1, Xcel Energy is proposing to remove and relocate 32 miles of Line W3316, a 27-mile portion of Line W3351, and 3.5 miles of Line W3606. A section of the removal of both Lines W3316 and W3351 will occur within the Bad River Reservation. In addition, regardless of the route selected, a 1.8-mile-long segment of Line W3606 will be removed from the Copper Falls State Park.

Xcel Energy proposes five route options for the relocated and rebuilt facilities identified as A, B, C, D, and E (see items 4-6 above), with the Project's western limit starting at Structure W3316-42 near the intersection of Pearce Road and Highway 13, southeast of Ashland. A more detailed description of the route options is included in Section 5.3. The route options generally follow State Highway 13 and Canadian National Railway's (CN) railroad right-of-way (ROW) between Ashland and Mellen, and State Highway 77 between Mellen and Hurley where existing 34.5 kV transmission lines W3606 and W3607 are located.

These route options generally follow the same corridor, with minor differences in segments. As such, the routes are generally described between the following cities: Ashland, Minersville, Highbridge, Mellen, Upson, Gile, Hurley and Ironwood. Additionally, lines W3316 and W3351 both terminate at the Gingles Substation approximately 1.8 miles northwest of Structure W3316-42. However, the portion of lines W3316 and W3351 between the Gingles Substation and Structure W3316-42 were rebuilt in 2001. Therefore, the starting point for the Project is Structure W3316-42, near the City of Ashland, where the original line remains in service.

The new lines would be designed to operate at voltages consistent with today's standard transmission voltages, but would be operated at their existing voltages. Currently 34.5 kV transmission lines are used in most places as distribution assets. However, the 34.5 kV lines in Wisconsin are a holdover from standard voltages 50 years ago. This is also true of the 88 kV voltage. Xcel Energy is one of last utilities in the nation to continue to maintain an active 88 kV system. Going forward, this voltage will be retired and existing 88 kV facilities will be replaced with 115 kV voltages. W3316 is proposed to be built to 161 kV because the significant network of this voltage have been recently upgraded on other projects in Central and Northern Wisconsin area. This voltage helps transfer more power over long distances with fewer losses. Table 1.3-1 identifies the current operating voltages of the existing facilities, the proposed design voltages and initial operating voltages the proposed facilities. For purposes of this Application, Xcel Energy uses the "designed to" voltages to describe the lines as shown in Table 1.3-1.

Table 1.3-1 Summary of Existing and Planned Voltages by Transmission Line

Line	Existing Voltage (kV)	Design Voltage for Rebuild (kV)	Initial Operating Voltage after Rebuild (kV)
W3606	34.5	69	34.5
W3607	34.5	69	34.5
W3351	88	115	88
W3316	115	161	115

1.4 Provide a list of all cities, villages, and townships and their respective counties that the proposed project, any associated facilities, and any potential construction activities would cross or potentially impact

The proposed Project involves the removal or construction of facilities located in Ashland and Iron Counties, Wisconsin. The cities and towns crossed or potentially impacted include:

- Construction of Facilities
    a. Ashland County
        - Town of Gingles
        - Town of White River
        - Town of Marengo
        - Town of Ashland
        - Town of Morse
        - City of Mellen

    b. Iron County
        - Town of Anderson
        - Town of Knight
        - Town of Pence
        - City of Montreal
        - City of Hurley

- Removal of Facilities
    a. Ashland County
        - City of Ashland
        - Town of Gingles
        - Town of Morse
        - Town of Sanborn

    b. Iron County
        - Town of Gurney
        - Town of Saxon
        - Town of Kimball
        - City of Hurley

1.5 PSC and WDNR Review

Information for Sections 1.5.1 to 1.5.4 is provided in the following discussion.

Pursuant to the requirements of Wis. Stat. §§ 1.11, 1.12, 196.025, 196.49 and 196.491, and Wis. Admin. Code chs. PSC 4, 111 and 112, Xcel Energy hereby apply to the Commission for a CPCN together with any other authorizations needed to construct the proposed Project. The Project is categorized as a Type II action pursuant to Wis. Admin. Code § PSC 4.10(2). Information necessary for the initial preparation of an Environment Assessment is included as part of this Joint Application.

Through this Joint Application and pursuant to Wis. Stat. § 30.025, 30.123 and 281.36, and Wis. Admin. Code chs. NR 102, 103, 299, and 320, Xcel Energy also hereby applies to the WDNR for permit authorization to discharge dredged and/or filled materials into wetlands and place temporary bridges across navigable waters. The wetland and waterway permit coverage necessary to construct the proposed Project listed in Section 8.0.

By this filing, Xcel Energy confirms its understanding that through the pre-application process provided for in Wis. Stat. § 30.025(1m), the WDNR, the PSC and Xcel Energy have conferred and made a preliminary assessment of the Project's scope and alternatives and have identified potentially interested persons in accordance with Wis. Stat. §§ 30.025(1m)(b) & (c). Xcel Energy has also been made aware of the information that they are required to submit as part of this Joint Application and the timing for submitting the information.

The Project is not contingent upon or part of a project under another docket number.

1.6 Project Details and Project Area Information

1.6.1 Location of Routes and Associated Facilities

Xcel Energy proposes removing and relocating the following lines:

- 115 kV W3316 between Structures 42 and 255, approximately 32 miles between Ashland and the west side of Hurley.
- 88 kV W3351 between Structures 33 and 255, approximately 27 miles between Ashland and the Saxon Pumping Station located east of Saxon.
- 34.5 kV W3606 between Structures 441 and 495 (or 503 depending on which route is selected), approximately 3.4 miles of 34.5 kV transmission line located immediately north of the Mellen city limits; 1.8 miles of which is within the Copper Falls State Park. The poles of Structures 466 to 495 (or 503, depending on route option) would be modified to remove the 34.5 kV circuit at the top of the structures. After the top is removed, the pole would continue to carry the existing distribution line that serves the Copper Falls State Park. The remaining poles would be approximately 35 feet tall.

Xcel Energy has developed five potential routes for the relocation of lines W3351, W3316 and W3606, all of which begin at Structure W3316-42 southeast of Ashland and terminate at the Ironwood Substation (in Ironwood, Michigan). For purposes of this Application, the termination

of the routes is the state boundary (approximately 0.4 mile of the W3351 line and 0.4 mile of the W3316 line rebuild will be located in Michigan)[6]. As previously noted in Section 1.3, all five routes generally follow State Highways 13 and 77 and existing 34.5 kV lines W3606 and W3607 with different routing amongst voltage configurations and around townships and cities. The five routes, shown in Appendix A, are generally described below:

- Route Option A generally follows the existing 100-foot wide ROW along W3606 and W3607 corridors between Structure W3316-42 (Ashland) and Structure W3316-255 (Hurley) with new ROW corridors along roads such as Van De Bruggen Road (Marengo), County Road C (Highbridge), Golf Course Road (Mellen), Kokogen Road (Gile) and Odanah Road (Hurley). The pole structures located in the existing ROW would be removed and rebuilt with single circuit 161 kV structures including some areas with a distribution circuit underbuild to continue to serve customers. New ROW corridors along Van De Bruggen Road would be built with double circuit 161/69 kV, County Highway C would be built with double circuit 115/69 kV pole structures, Golf Course Road would be built with two paralleling lines of double circuit 115/69 kV and single circuit 161 kV, Kokogan Road would be built with single circuit 161 kV, and Odanah Road would be built with a single circuit 161 kV with distribution underbuilt.
- Route Option B follows the existing 100-foot wide ROW along W3606 and W3607 corridors between Structure W3316-42 (Ashland) and Structure W3316-255 (Hurley) with new ROW areas such as along State Highways 13 and 77 south side and Van De Bruggen Road (Marengo). The pole structures located in the existing ROW would be removed and rebuilt with a combination of single circuit 115 kV including some areas with a distribution circuit underbuilt to continue to serve customers and double circuit 115/69 kV. New ROW corridors along State Highway 13 would be built with single circuit 161 kV. Along the south side of State Highway 77, the lines would be built with double circuit 161/69 kV, and Van De Bruggen Road would be built with double circuit 161/115 kV.
- Route Option C uses new ROW along the existing 34.5 kV line corridor. It follows the existing 100-foot wide ROW along W3606 and W3607 corridors with different configurations than Route A around Marengo, Highbridge, Gile, and Hurley including new ROW areas such as Lohman Road and Poor Farm Road (both near Highbridge), Golf Course Road (Mellen) and State Highway 13 north of Mellen. The pole structures located in the existing ROW would be removed and rebuilt with single circuit 161 kV including some areas with a distribution circuit underbuilt to continue to serve customers. New ROW corridors along Lohman Road and Poor Farm Road would be built with double circuit 115/69 kV, Golf Course Road would be built with single circuit 161 kV and State Highway 13 near Mellen would be built with double circuit 115/69 kV.
- Route Option D is a blended option of Routes A and C with local modifications north of Highbridge, northeast of Mellen, and in Upson. It follows the existing 100-foot wide ROW

[6] There are no State of Michigan regulatory requirements associated with the Project.

along W3606 and W3607 corridors with different configurations than Routes A and C around Highbridge, Mellen, Upson, Gile, and Hurley including new ROW areas such as Van De Bruggen Road (Marengo), County Highway C, Delafield Road, Seaquist Road, Davis Road (all near Highbridge), Golf Course Road (Mellen), State Highway 13 north of Mellen, greenfield areas located north and east of Mellen city limits near future Enbridge pipeline and existing Northern Natural pipeline, northeast of the East Mellen Substation to State Highway 77 and Sessions Avenue in Upson. The pole structures located in the existing ROW would be removed and rebuilt with single circuit 161 kV including some areas with a distribution circuit underbuilt to continue to serve customers except in Marengo where it will be rebuilt with 115/69 kV. New ROW corridors along Van De Bruggen Road would be built with double circuit 161/69 kV, whereas County Highway C, Delafield Road, and Seaquist Road would be built with double circuit 115/69 kV, Golf Course Road would be built with single circuit 161 kV, State Highway 13 would be built with double circuit 115/69 kV, greenfield areas north and east of Mellen city limits would have two paralleling lines of single circuit 161 kV and double circuit 115/69 kV, Sessions Avenue in Upson would be single circuit 69 kV with distribution underbuild.

- Route Option E is similar to Route Option D except it is offset from the existing W3606 corridor to avoid any transmission line ROW overlap with railroad ROW. New ROW areas include Van De Bruggen Road (Marengo), County Highway C, Lohman Road, Poor Farm Road (all near Highbridge), Golf Course Road (Mellen), State Highway 13 north of Mellen, greenfield areas north and east of Mellen city limits near a future Enbridge pipeline and existing Northern Natural Gas pipeline, northeast of the East Mellen Substation to State Highway 77, and Odanah Road along an abandoned 34.5 kV corridor.

All five routes include the removal of 1.8 miles of the single circuit 34.5 kV W3606 line within Copper Falls State Park. Furthermore, regardless of the route option selected, approximately 1.6 miles of the single circuit 34.5 kV W3606 line between existing Structures 441 and 465 will be removed. Approximately 1.8 miles of the single circuit 34.5 kV W3606 line with distribution underbuild between existing Structures 466 and 495 will be modified to distribution-only structures by removing the 34.5 kV top circuit on a .7-mlie segment within the Copper Falls State Park.

Routes D and E will modify an additional 0.5-mile of single-circuit 34.5 kV line W3606 with distribution underbuild between existing structure numbers 496 to 503; the 34.5 kV top circuit will be removed and the distribution underbuild will remain.

Further detail on each route is included in Section 5.3.7.

1.6.2 Footprints of Associated Facilities

Xcel Energy is not proposing any new substations or upgrades to existing substations other than relaying equipment, which is necessary for system protection and public safety purposes.

1.6.3 Generalized Geology, Topography, Land Cover, and Land Use

Wisconsin has been divided into five natural geological regions, with three considered to be upland areas and two being lowland. The general boundaries of the areas were predominantly established based upon the type of the underlying bedrock. The Project is located within the Northern Highland and Lake Superior Lowland regions. The Northern Highland region is an upland area characterized by moderately large hills and valleys, while the Lake Superior Lowland region borders Lake Superior and does not extend more than 20 miles from the Lake Superior Shore.

The topography of the Project vicinity is relatively flat in the western portion (i.e., Structure W3316-42 to Highbridge) with elevations ranging from 625 to 970 feet above mean sea level but gets hillier as it moves to the east (Highbridge to Hurley) with elevations ranging from 890 to 1,690 feet above mean sea level (Appendix A, Figure 5). Land cover in the Project area is predominantly forested and developed (i.e., roads), with agricultural lands interspersed amongst forested areas in the western portion of the Project. Land Use is predominately private forest and transportation (roads and railroad) with public lands (e.g., White River Wildlife Area and Copper Falls State Park) also being crossed. Public lands are displayed on Appendix A, Figure 8.

1.6.4 Special or Unique Natural or Cultural Resources

The following summarizes special or unique natural resources that the proposed routes cross. Most of these features are addressed in more detail in other sections of this Application such as Sections 5.4 (Impact Tables), 6.3 (Wetlands), 6.4 (Waterways), 7.7 (Parks and Recreation) and 8.0 (WDNR Wetland/Waterway Permitting). Additionally, archaeological and other culturally sensitive resources can be found across the Lake Superior shoreline and terraces along major waterways. There are few known mapped culturally sensitive sites within the proposed Project rights-of-way or temporary access routes. Natural resources are shown on maps provided in Appendix A, Figure 5.

All five proposed route options cross several special or unique natural resources including:

- White River Wildlife Area – Ashland owned and managed by the WDNR in northwest Ashland County (for more information see Section 7.7);
- Several Outstanding and Exceptional Resource Waters (ORWs and ERWs, respectively) and trout streams regulated by WDNR and identified in Section 6.4 (Waterbodies/ Waterways); and
- Route E crosses one state-owned parcel just south of the Copper Falls State Park boundary (for more information see Section 7.7).

Lines W3351, W3316, and W3606, which will be removed and relocated, are currently located in special or unique natural resources including:

- The Bad River Reservation;
- Copper Falls State Park owned and managed by WDNR north of Mellen (see Section 7.7 for more information); and
- Several ORWs/ERWs identified in Section 6.4 (Waterbodies/Waterways).

More details regarding approvals needed for crossing WDNR lands are included in Sections 1.6.7, 5.3 and 7.7.1.

1.6.5 Areas of Residential Concentrations and Urban Centers

Residential concentrations and urban centers crossed by the Project routes include the cities of Mellen, Montreal, and Hurley. There are also several townships along the routes including White River, Marengo, Minersville, North York, Highbridge, Tyler Forks, Rouse, Upson, Iron Belt, Hoyt, Pence, and Gile.

1.6.6 Transmission Configuration and Proposed Right-of-Way (ROW)

This section contains a high-level overview of the transmission configuration options and proposed ROW. Appendix C includes a detailed table that describes start and end points for each transmission configuration (single, double, or triple circuit transmission; single, double, or triple circuit transmission with distribution underbuild; or single, double, or triple circuit transmission with distribution buried underground nearby).

Each route option has two general corridors. One corridor is for a double circuit configuration and one corridor is for a single circuit configuration with intermittent distribution underbuild. The routes are designed in this way to provide redundancy and reliability such that a single incident (i.e., a tree falling) would not impact all three circuits. For all five route options, crossing of the White River is designed as three parallel single circuit crossings to span the long valley on both sides of the river. Similarly, there are four (4) locations that have a triple circuit transmission configuration including one (1) between Highbridge and Mellen along Highway 13 (Route B) and three (3) between Mellen and Upson along State Highway 77 (Routes A, C, D, E). Locations where a triple circuit configuration is proposed include areas near cabins and homes where a landowner has requested that the Company minimize the ROW width and increase the distance between the new facilities and the home or cabin. Xcel Energy prefers to limit (minimize) the amount of triple circuit configuration on the Project, for line maintenance worker safety and system operations flexibility reasons.

For each route option, except Route E between Ashland and Mellen, Xcel Energy will generally follow and use a portion of its existing 100-foot ROW within each corridor. Where the single and double circuit transmission corridors are parallel, 25 feet of the existing ROW will be shared and 75 feet of new ROW will be added for the second paralleling corridor. This reduces the total ROW required for the lines from 200 feet wide to 175 feet wide total for both corridors. Along the portions of the route options where the single and double circuit transmission corridors are not

parallel, the new ROW width will be 100 feet wide. See Table 1.6-1 for a summary of the typical ROW widths proposed for the route options.

Table 1.6-1 Typical ROW Widths

Structure Configuration (with or without distribution underbuild)	ROW Width (feet)
Single Circuit (161, 115, and 69 kV)	100
Single Circuit (161, 115, and 69 kV) with Distribution Underbuild	100
Single Circuit (161, 115, and 69 kV) with Distribution Underground buried nearby	100
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV)	100
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV) with Distribution Underbuild	100
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV) with Distribution Underground buried nearby	100
Single (161, 115, or 69 kV) and Double Circuit (161/69 kV, 115/69 kV, and 161/115 kV) - parallel lines with 75 foot spacing between lines	175
Triple Circuit (161/115/69 kV)	100
Three (3) Single Circuit (161, 115, or 69 kV) - parallel lines with 75 to 125 foot variable spacing between lines	Varies 250 to 375

As described above, the White River crossing requires three parallel single circuit crossings. At the White River, the ROW will be up to 375 feet wide due to an approximately 1,600-foot-long span (up to 125-foot ROW for each circuit, which includes 23 feet of blowout for each line).

Xcel Energy is working to obtain deeds and land records for parcels along each route that will verify the extent of the existing rights of way (roads, railroads, distribution lines). For the purposes of this Application, Xcel Energy has made assumptions on existing ROW widths to determine corridor sharing. Appendix C details corridor sharing assumptions for each configuration. For a general 100-foot ROW that shares corridor with roads, Xcel Energy assumes up to 45 feet of shared ROW (road overhang) and 55 feet of new ROW (on private property) when poles are centered 5 feet onto private property. For a general 100-foot ROW that shares corridor with railroads, Xcel Energy assumes up to 100 feet of shared ROW (on railroad property) when poles are centered 50 feet onto railroad property. This assumes poles for the existing 34.5 kV line are up to 50 feet inside the assumed 200-foot wide railroad ROW. This only applies to Routes A, B, C, and D (not Route E).

1.7 Other Agency Correspondence/Permits/Approvals

1.7.1 Agency Correspondence

Copies of Xcel Energy's correspondence with governmental agencies concerning the Project are included in Appendix F. Details on Xcel Energy's community outreach, including coordination with agencies is discussed in Section 7.1.

1.7.2 State and Federal Permits/Approvals Required

All anticipated state and federal permits and approvals required for this Project and their status are listed in Table 1.7-1. WDNR wetland and waterway permits and approvals are further discussed in Section 8.0.

Table 1.7-1 State and Federal Permits and Approvals

Agency	Activity	Permit Type	Status
FEDERAL AGENCIES			
U.S. Army Corps of Engineers (USACE)	Impacts on Waters of the US	Section 404 of Clean Water Act (CWA)	Applicant will apply for the permit on the ordered route.
	Archaeological Review	Section 106 National Historic Preservation Act	A Cultural Resources assessment has been prepared as part of this Application. Applicant will submit information to USACE once a route has been ordered.
U.S. Fish and Wildlife Service (USFWS)	Federally listed rare species review and activities near eagle nests	Endangered Species Act; Bald and Golden Eagle Protection Act	Applicant has conducted a review of rare species and eagle nests in the Project area and sent a letter requesting comment on January 11, 2021. Xcel Energy will continue to coordinate with the agency as applicable.
U.S. Department of the Interior - National Park Service (NPS)	Removal and crossing of the North Country Scenic Trail	Access Permit	Xcel Energy is coordinating with the NPS for the removal work and potential crossing of Route E.
TRIBAL			
Bad River Natural Resources Department	Removal of W3351 and W3316, Access Permit	Access Permit	Xcel Energy is coordinating with the Bad River Band on the future removals of these two lines.

Table 1.7-1 State and Federal Permits and Approvals			
Agency	**Activity**	**Permit Type**	**Status**
STATE AGENCIES			
Department of Agriculture, Trade and Consumer Protection (DATCP)	Potential use of eminent domain on more than 5 acres of any farm operation	Agricultural Impact Statement (AIS)	Based on a response from DATCP on April 29, 2021, Xcel Energy will submit an Agricultural Impact Notice. An AIS will be required for the Project because there are properties with agricultural components where more than 5 acres would be crossed.
Wisconsin Department of Transportation (WisDOT)	Oversize Loads or Excessive Weights on Highways, Lane closures to install matting	Wis. Stat. ch. 348 Vehicles – Size, Weight and Load; Wis. Stat. §348.25 – Vehicle Weight and or Load Permit	Applicant will work with the WisDOT to determine if any are necessary.
	Construction within WisDOT road right-of-way	Permit to Construct, Operate, and Maintain Utility Facilities on Highway Right-of-Way	Applicant will apply for the permit prior to construction.
Wisconsin Historical Society (WHS)	Archaeological Review	Approval of Archaeological Surveys (Wis. Stat. § 44.40 and Section 106 of National Historic Preservation Act	A cultural resources assessment has been prepared for this Application.

Table 1.7-1 State and Federal Permits and Approvals			
Agency	**Activity**	**Permit Type**	**Status**
Wisconsin Department of Natural Resources (WDNR)	Discharge of Dredged or Fill Material into Wetlands	Wetland Individual Permit under Ch. 281.36, Wis. Stats. and NR 103 and 299, Wis. Admin. Code	See Section 8.0.
	Placement of Temporary Clear Span Bridges over Navigable Waters	Waterway Crossing Permit under Ch. 30.123, Wis. Stats. and NR 102 and 320, Wis. Admin. Code	See Section 8.0
	Construction Site Stormwater permit	Wisconsin Pollution Discharge Elimination System General Permit under NR 216, Wis. Admin. Code	See Section 10.0
	Copper Falls State Park removal and crossing	Land Use Agreement	Xcel Energy is coordinating with the WDNR for the removal work relating to W3606 within Copper Falls State Park.

1.7.3 Local Permits

In addition to the approvals and permits issued by state agencies, the necessity of seeking local approvals for this utility construction Project is governed by Wis. Stat. §§ 196.491(3)(i). Xcel Energy will work with all local units of government to ensure that the representatives of those units of government affected by the Project are informed regarding Xcel Energy's proposed construction activities. Xcel Energy will apply for those permits and other authorizations governed by local ordinances (county, town, village, or city), as required. These permits include road crossing and road weight limit permits.

Local ordinances often address siting and location issues for the construction of utility facilities, land use issues including recreational uses and aesthetics, or natural resource protection issues associated with ground-disturbing activities. These types of authorizations would require conditional use permits, zoning permits or variances, which often involve quasi-judicial proceedings and the exercise of discretion on the part of the local unit of government on whether the authorization or permit may be granted. Because the Commission's statutory obligation is to address the siting of proposed utility facilities, and to address land use, recreational use and aesthetics in the siting and route selection for transmission lines, Xcel Energy does not apply for these types of permits or authorizations. However, Xcel Energy will supply the involved local governments with information about the Project and requests the various units of local

government to provide the PSC and Applicants with their comments or concerns regarding the siting and location of the proposed Project.

Similarly, at the county level, local permits and ordinances might otherwise apply to ground disturbing activities associated with the proposed Project routes absent the provisions of Wis. Stat. § 196.491(3)(i). Both Ashland and Iron counties regulate ground disturbing activities under their shoreland zoning ordinances.

1.7.4 Railroad ROWs

All route options, except for Route Option E, have portions within the CN railroad ROW between Structure W3316-42 and Mellen. As previously mentioned in Section 1.6.6, Xcel Energy is researching deeds at the Ashland County courthouse to verify the easement width and ownership along this railroad corridor. The existing W3606 34.5 kV line parallels and shares ROW with the railroad, which Xcel Energy would utilize for the relocation of the lines. Xcel Energy assumes the railroad ROW is 200 feet and, in some cases, anticipates up to 100 feet would be shared ROW. The lines to be removed do not cross railroad ROW.

CN notified Xcel Energy on January 11, 2021 that all requests for ROW easements or amendments to existing license agreements are on hold until sale of the railroad is finalized. On March 30, 2021, CN issued a news release stating it had sold 650 miles of track in Wisconsin to WATCO, including the portion along W3606 between Ashland and Mellen. Xcel Energy corresponded with WATCO's real estate director on April 8, 2021, but at this time WATCO is not able to confirm if it will grant future easement rights for the various route options proposed within the railroad ROW. Xcel Energy will continue to provide the Commission updates as the process evolves.

It is uncertain whether WATCO is willing to grant easements for new transmission lines within the railroad property. Therefore, Xcel Energy developed Route E which is located adjacent but outside of the estimated railroad ownership.

1.7.5 Pipeline ROWs

All five routes have perpendicular crossings of an existing Northern Natural Gas (NNG) pipeline on the east side of Mellen. Routes D and E also are adjacent to and parallel NNG. Route D parallels NNG for 0.80 mile and Route E parallels NNG for 0.95 mile. An additional two crossing of Enbridge Inc.'s proposed Line 5 pipeline is anticipated on the north side of Mellen near State Highways 13 and 169, depending on Enbridge's final location.

The three proposed removal lines also cross pipelines. W3316 would be removed from an existing NNG pipeline corridor. W3351 would be removed from an existing liquid petroleum pipeline corridor near the Saxon pump (an Enbridge pumping station). If Route D or E is selected, there would be an additional pipeline corridor crossing removed along the W3606 Removal south of Copper Falls State Park.

1.7.6 Wisconsin Department of Transportation (WisDOT) ROWs

The Project will require WisDOT permits to cross highways between State Highway 13 between Structure W3316-42 and Mellen and State Highway 77 between Mellen and Hurley (see Table 1.7-2).

Table 1.7-2 Summary of Highway Crossings by Route

Highway	Route A	Route B	Route C	Route D	Route E
Highway 13	4	5	3	4	4
Highway 77	9	12	9	9	6
Total	**13**	**17**	**12**	**13**	**10**

The Project may also parallel or occupy state highway ROW. The full extent of the areas of overlap cannot be determined until surveys are completed. WisDOT has plan sheets, but does not have GIS shapeliness to assess the extent of highway occupation that will occur. Based on its review of the plan sheets and/or visual inspections, Xcel Energy has identified the following areas of highway overlap for Route B:

- An approximate 1.5-mile section just north of Marengo;
- An approximate 3-mile section between Minersville and Highbridge (this is an area where the proposed 100-foot-wide ROW falls between Highway 13 and the CN railroad); and
- Generally along Highway 77 between East Mellen and Iron Belt where Route B follows the south side of the highway. This section is approximately 16 miles and is inconsistently in and out of the WisDOT ROW based on aerial interpretation only.

The other route options (A, C, D, and E) may also overlap WisDOT highway ROW in the area between East Mellen and Iron Belt. In this area, the existing line W3607 ROW follows the north side of the Highway 77.

The removal portion of W3351 crossing State Highway 2 is located between Structures 121-122.

The removal portion of W3316 crossing State Highway 122 located between Structures 192-193.

Xcel Energy will work with WisDOT to fully inventory the areas of overlap and obtain all necessary approvals for occupying WisDOT ROW prior to construction.

1.8 Construction Schedule

1.8.1 Provide the anticipated general construction schedule, identifying any potential seasonal or regulatory construction constraints.

The estimated construction duration of the new transmission lines is approximately 2 years. Construction is expected to begin in the 2nd Quarter of 2024 and be in-service by the 4th Quarter of 2026, pending agency permits and authorizations. Removal of W3606 Structures 441 to 495 (or 503), W3351 Structures 33 to 255, and W3316 Structures 43 to 255 will follow the energization of the relocated lines and is anticipated to occur between 2027 and 2028.

Xcel Energy has not identified any regulatory constraints to the construction schedule at this time other than road restrictions during spring break-up. Due to the hilly terrain in the Project area, and the large amount of snowfall during typical winters, there may be times when conditions on the ROW, particularly locations not adjacent to roads, are not accessible to construction equipment, and it may be necessary to adjust the schedule to accommodate these conditions.

Xcel Energy anticipates constructing the Project according to the following schedule provided in Table 1.8-1:

Table 1.8-1 Anticipated Construction Schedule

Project Activity	Preliminary Date
Joint PSC CPCN and WDNR Wetland and Waterway Application Submittal	May 2021
PSC CPCN Approval - Anticipated	3rd Quarter 2022
WDNR Wetland and Waterway Permit Issuance - Anticipated	3rd Quarter 2022
Complete Engineering and Design	2nd Quarter 2023
Complete Easement Procurement	2nd Quarter 2024
Start Vegetation Removal	2nd Quarter 2024
Start Installing Mats	4th Quarter 2024
Start Civil and Line Construction	4th Quarter 2024
Project In-Service	2026
Removal of W3606, W3351 and W3316	2027-2028

Xcel Energy is aware that the Commission sometimes conditions CPCNs on construction starting within one year of the date of the Final Decision. Based on the construction schedule laid out above, Xcel Energy requests that the Commission provide the Company additional flexibility on any order points relating to the start of construction and authorize construction by construction spread, as identified by Xcel Energy, provided that all necessary permits are obtained for a construction spread before work begins on that construction spread.

1.8.2 Generally discuss any generation or transmission outage constraints that may have to be accommodated.

Xcel Energy plans to operate the existing W3351 88 kV and W3316 115 kV transmission lines while the new sections of lines are being constructed in years 2024-2026. Once the new line sections are cut-in, the removal process for portions of W3606, W3351, and W3316 will begin.

During the short (approximately 1 week) outage of line W3351 after the construction of the new circuit is complete, the Bay Front generating plant will have a single outlet to the transmission system. This outage will not pose any threat to the transmission system as the plant, through the single outlet, has full capability to deliver power to the system. In a system intact scenario, the plant normally has two outlets to the network. After this outage is complete, Bay Front will have two sources once again.

For the outage of W3351 or W3316, the Ironwood area can be served from the south through Weber Lake. This leaves the system on a radial feed from Park Falls which is not ideal for long term scenarios. However, during these short outages, the system will remain within all required limits.

During construction of lines W3606 and W3607, it will be necessary to build line sections from the Mellen area first to make sure communities served by the 34.5 kV system have sufficient voltage support.

1.9 Project Maps

Consistent with the Application Filing Requirements and consultation with state agencies, a set of Project maps is provided in Appendix A, Figures 1 through 8.

Map figures included:

Figure 1 – Project Location

Figure 2 – Existing Transmission System

Figure 3 – Routes Considered

Figure 4 – Project Related Data

Figure 5 – Environmental Data

Figure 6 – Land Use

Figure 7 – Zoning

Figure 8 – Public Lands and Recreation Areas

The maps showing the proposed routes and other Project data are provided on aerial photographs and include Environmental, Parcel, Land Use and Existing Utility/Infrastructure data. The maps in Appendix A also contain environmental information required to support WDNR permitting activities. Xcel Energy is providing separately to the Commission, in electronic format, Geographic Information System (GIS) data files supporting the mapping.

1.10 ESRI ArcGIS Data Files

All Project maps were created using ESRI ArcGIS 10.5. Xcel Energy will also provide the Commission a spreadsheet listing all GIS data sources, a description of the data, and the date the data was generated or collected.

1.11 Mailing Lists

Mailing lists of key stakeholders and all affected private and public landowners located within 0.5 mile of the Project's proposed transmission centerlines, including properties on both sides of a roadway regardless of distance, are provided in electronic format as Microsoft Excel spreadsheets. The data includes all of the required information listed in AFR Sections 1.11.1 through 1.11.4

The landowner list provided is based on publicly available tax roll and spatial data recently acquired from Wisconsin Statewide Parcel Data (V6) for the preparation of this Joint Application. Over the life of a project, owners may change. Xcel Energy has made its best efforts, however, to use the most accurate information available. This includes some updates to the list after receiving updated information from affected landowners (change of address, additional owner, etc.). Xcel Energy held open houses in March and October 2020, as well as March 2021 and notified all landowners within 0.5-mile of each route option for every open house.

This application will be mailed to three libraries in the Project vicinity, including the Vaugh Library in Ashland, the Legion Memorial Library in Mellen, and the Hurley Public Library in Hurley. The addresses for these libraries are included in Appendix G.

2.0 PROJECT NEED AND ENGINEERING

2.1 Project Need

Xcel Energy is the transmission provider to the Bayfield, Ashland, and Ironwood areas as well as the distribution provider for roughly 75% of customers in the region, with the remaining customers served by Bayfield Electric Cooperative. The Project is needed to ensure reliable electric service to the Bayfield, Ashland and Ironwood areas. The reliability concerns are created by three factors: 1) The advanced age and poor condition of the existing facilities; 2) difficult terrain that constrains access to the facilities which are located remote from roads; and 3) limited land rights. The proposed Project will address these reliability issues and provide load serving capability to meet demand for several decades.

The Project will rebuild four lines: Lines W3351, W3316, W3606 and W3607. Line W3351 is an 88 kV line that connects Xcel Energy's existing Bayfront Substation in Ashland, WI and Norrie Substation in Ironwood, MI. Line W3316 is a 115 kV line that connects Xcel Energy's existing Gingles Substation in Ashland, WI, to the Hurley Substation in Hurley, WI, and the Ironwood Substation in Ironwood, MI. Line W3606 is a 34.5 kV line that generally follows either Highway 13 or the CN Railroad corridor between Xcel Energy's Gingles Substation in Ashland, WI and East Mellen Substation in Mellen, WI. Line W3607 is a 34.5 kV line that generally follows Highway 77 between Xcel Energy's East Mellen Substation in Hurley, WI and Ironwood Substation in Ironwood, Michigan. See Figure 2 in Appendix A for an overview of Xcel Energy's existing system which in 2020 served a non-coincident peak load of 39 megawatts (MW). The rate of demand increase in the area is modest, with an expected increase of several megawatts over the next decade.

Line W3351, 88 kV, constructed in 1952, is nearly 70 years old. The structures are H-frame, wood poles. While today's standard is for all new lines to be built with shield wire(s) to protect the structures, W3351 does not have any shield wires. As a result, the poletops, crossarms, and insulators have sustained a significant amount of lightning damage. The majority of the poles are either trussed or deteriorating from natural weathering or animal damage. Latest reports show that 258 of the 336 structures of W3351 have recordable pole defects. Furthermore, this line had low wire to ground clearance issues that had to be mitigated by installing steel phase raisers in the last 3 years. However, even with this mitigation effort, the line capacity had to be de-rated from a limit of 56MVA down to 50MVA.

Line W3316, 115 kV, constructed in 1976, is 45 years old. The structures are H-frame, wood poles and include dual shield wires. The damages to W3316 are less than to W3351 due to the presence of the shield wires, but poles have sustained lightning damage to insulators and cross arms. While they are also worn from weather and animals, with reports showing 214 of 270 structures with reportable pole defects. While this number of defect poles is high, most are of moderate to low severity and are expected for a line of this vintage in this location. Xcel Energy estimates that within the next eight to ten years W3316 would require a partial refurbishment

to replace poles, crossarms and insulators that have reached their end of life. This refurbishment would extend W3316's service life by approximately 15 years (from 50 years to 65 years) until the early-mid 2040s when a complete rebuild would be necessary.

Line W3606, 34.5 kV, constructed in 1979, is 42 years old. The structures are single, triangular configured, wood poles with a shield wire. 2020 pole testing results show wood poles are beginning to deteriorate more rapidly with a 6% failure rate. For reference, a failure rate of 2-3% is considered average. As a result of pole testing Xcel Energy will reinforce or replace defective poles to ensure safety and reliability. Similar to line W3316, this line will also require refurbishment in the next eight to ten years, replacing existing porcelain bell insulators and fiberglass epoxirod arms with polymer horizontal post insulator units. A complete rebuild would also likely be required in the early-mid 2040s but may be accelerated pending W3606s results from Xcel Energy's year 2032 pole testing cycle. If the rejection rates continue to be high, Xcel Energy will evaluate the need to advance the complete reconstruction of this line.

Line W3607, 34.5 kV, constructed in 1949, is 72 years old. These structures are also single, triangular configure, wood poles without a shield wire. This line has already been identified for complete reconstruction with 9.6 miles already replaced in 2013. Approximately 17 miles of the original 1949 vintage line remains. In recent years, construction has been deferred to coordinate with this proposed project. Xcel Energy continues to monitor and maintain this line to ensure safe and reliable service.

The existing lines are located, in substantial part, in areas away from roads and other means of access. Their remoteness complicates maintenance of the line and delays repairs. The area also has difficult terrain, including large wetland complexes, beaver ponds, rock outcroppings, rivers, bogs that do not freeze and steep rugged terrain.

Figure 2.1-1 Examples of Difficult Terrain along Existing Lines

As a result, Xcel Energy has had to use non-standard maintenance and vegetation management techniques. For example, there are locations where Xcel Energy is not able to access by vehicle and crews have had to use canoes and boats to reach the transmission line poles. This atypical means of access creates safety concerns.

Xcel Energy also has limited land rights for W3351 and W3316 which cross the Reservation. The easement for W3351 has expired and Xcel Energy is negotiating land rights with the Bad River Band for both lines.

In addition, Xcel Energy must also comply with Bad River Band requirements for conducting maintenance work on the Transmission Lines. This results in sometimes unpredictable access timing and additional obligations regarding invasive species monitoring and equipment and vehicle inspections for each entry on the reservation.

This Project will allow Xcel Energy to have land rights for its transmission lines, solve the condition issues attributed to W3351 and alleviate the access and land rights issues. This Project will allow the lines to be rebuilt to current standards which will increase reliability of this line.

2.2 Transmission Network Alternatives

The Ashland to Ironwood project has three drivers, poor condition, poor access and limited land rights. The project preferred solution as well as the alternatives focused on options that would solve all three reliability issues. Initially, Xcel Energy investigated rebuilding lines W3351 and

W3316 in their existing locations, however this solution was screened from further consideration because it did not resolve the access constraints or land rights issues.

The preferred option is to rebuild both W3351 and W3316 to a more accessible location where land rights can be attained. W3351 would be built to future 115 kV capability but operated at 88 kV for the foreseeable future. W3316 would be built to future 161 kV capability but operated at 115 kV for the foreseeable future. These operating voltages are the same as they have been since the lines were originally constructed. Additionally, because lines W3606 and W3607 follow the approximate route from Ashland to Ironwood with good accessibility and land rights, Xcel Energy proposes to route generally along these lines. Because these lines are at the end of their life span, they will be rebuilt and located on common towers with W3351 and W3316.

The other two alternatives which are described in more detail below in Section 2.2.2, include the same transmission line work as the preferred option but upgrade the line voltages of W3351 and W3316. These alternatives would require the same amount of transmission line work—approximately 47 miles of rebuild, but also require significant substation upgrades.

2.2.1 Describe the preferred solution

The preferred option requires construction of the following facilities:

- Rebuild line W3351 along State highways 13 and 77 from approximately structure W3351-33 to structure W3351-336. This option proposes to build this line to future 115 kV capability, however, it will be operated at its existing voltage of 88 kV for the foreseeable future.
- Rebuild line W3316 along State highways 13 and 77 from approximately structure W3316-42 to structure W3316-270. This option proposes to build this line to future 161 kV capability, however, it will be operated at its existing voltage of 115 kV for the foreseeable future.
- Rebuild lines W3606 and W3607 in the same corridor as the two lines listed above. This option proposes to build these lines to future 69 kV capability, however, it will be operated at its existing voltage of 34.5 kV for the foreseeable future.

Xcel Energy proposes to keep the two high voltage lines on separate towers with the 34.5 kV lines W3606 and W3607 and any distribution circuits being double circuited or underbuilt on the high voltage structures. This keeps ensures a reliable 34.5 kV load serving system as well as high voltage transmission system.

2.2.1.1 Identify and describe any transmission line facilities that would be added or altered for this project. Include one-lines where appropriate.

Lines W3351 and W3316 will both be rebuilt with certain sections being relocated and removed as a part of this project. Segment W3606 will also be rebuilt and relocated. Other portions of

line W3606 and line W3607 are proposed to be rebuilt as on the same structures as the high voltage transmission lines.

This Project will not add any new transmission lines to the system. The Ashland to Ironwood Project instead rebuilds and strengthens the lines that currently exist in the region.

One-lines of the system before and after are included in Appendix D.

2.2.1.2 Identify and describe any substation facilities that would be added or altered for this project. Include electric schematics where appropriate. Substation Filing Requirements may also apply.

The proposed solution in this application for the Ashland to Ironwood project does not include any substation facility changes. However, because the lengths of the lines will change, the impedance of the transmission lines will be different. This will require relay updates at Gingles, Hurley, Bay Front and Norrie Substations in order to protect the system from faults. These changes will all take place in the control house of the substations. Therefore, the footprint and physical look of these substations will not change.

2.2.2 Discuss the viable Alternatives considered

Xcel Energy considered three options that would resolve the three reliability needs: age and condition, access and land rights. They are detailed in Table 2.2-1 below:

Table 2.2-1: Viable Alternatives Considered

Option 1 **Proposed Project**	• Rebuild W3351 and W3316, operate them at their current voltage levels of 88 kV and 115 kV • 47 miles of rebuilt W3351 • 47 miles of rebuilt W3316 • 21 miles of rebuilt W3606 • 26 miles of rebuilt W3607
Option 2 **Alternative Project**	• Rebuild W3351 and W3316, operate W3351 at 115 kV and W3316 at its current voltage of 115 kV • Expand the 115 kV substation at Bay Front and terminate W3351 in the expanded yard • Rebuild Saxon Pump substation and the 7 mile tap to it, operate at 115 kV • Terminate line W3351 in the 115 kV yard at Norrie • 54 miles of rebuilt W3351 • 47 miles of rebuilt W3316 • 21 miles of rebuilt W3606 • 26 miles of rebuilt W3607

Table 2.2-1: Viable Alternatives Considered	
Option 3 Alternative Project	• Rebuild W3351 and W3316, operate W3351 at its current voltage of 88 kV and W3316 at 161 kV • Expand Gingles substation and move W3316 to the new expanded 161 kV yard • Convert the proposed Hurley to Norrie 115 kV line to 161 kV and use it as an extension to Norrie. • Build a new 161 kV yard at Norrie • 47 miles of rebuilt W3351 • 47 miles of rebuilt W3316 • 21 miles of rebuilt W3606 • 26 miles of rebuilt W3607

For each of these options, Xcel Energy prepared planning level cost estimates solely for the purpose of assessing the relative cost of one option to the other.

Planning Level Cost Estimates	
Option	**Cost[1]**
Option 1 - Proposed Project	$92 M
Option 2 - Alternative Project	$107 M
Option 3 - Alternative Project	$108 M
[1]The Planning Level Cost Estimates do not include other relevant permitting, construction adder, and indirect costs. The total Project cost for each option would be greater than the Planning Level Cost Estimates shown above.	

2.2.3 For the discussion of the Preferred Solution and viable Alternatives include the following, as appropriate:

2.2.3.1 Provide relevant regional studies of transmission networks solutions

There was no regional analysis completed as part of this project due to the lack of regional lines in the study area. The study area is mostly local power transfer from Ashland to Ironwood to Park Falls. Thus, the impacts of all options on the regional transmission system are negligible and therefore a full regional analysis was not needed. However, the Ashland to Ironwood Project, as described in the proposed Project, has been included in the MISO (Midcontinent Independent System Operator, Inc.) Transmission Expansion Planning (MTEP) models for MTEP21 with an expected in-service date of 2025.

2.2.3.2 Provide details of the reliability and performance benefits of each network solution studied, as available.

Currently, there is no NERC or NSP Planning Criteria violations related to these lines. This is driven by reliability concerns caused by poor condition of the lines, access constraints and limited land rights. All options assessed provide reliable transmission service to the area and meet NERC and NSP Planning Criteria requirements.

All three alternatives would address the three reliability needs. Option 1, the proposed Project, is the least cost option and requires fewer facilities.

Additional information can be found in the Transmission Planning Study in Appendix D.

2.2.3.3 Supply the electrical losses for each alternative, peak MW and annual GWH estimates.

The net system losses vary for each option and a cost can be estimated using the publicly available Midcontinent Independent System Operator, Inc. Rates for Open Access Transmission Tariff Schedule 9 rates. The March 2021 Network rates for NSP are $53,300.6924 /MW-YR. The annual losses are taken from the Summer peak models used in the Transmission Planning Study and given dollar amounts using the rate above (see Table 2.2-2).

Table 2.2-2 Estimated Net Losses by Option - W3351

Option	2025 Net Losses (MW)	Annual Savings
Option 1	-1.00	$53,300
Option 2	-1.00	$53,300
Option 3	-1.3	$69,290

When comparing the annual loss savings from the Base Case against either option, there is not enough difference in the amount of savings to justify one project or another.

2.2.3.4 For generator interconnections, supply the detailed short circuit, stability and thermal analysis studies that have been performed. There must be some initial studies performed in order for the application to be complete.

This Application does not include a generator interconnection. Therefore, these studies are not applicable.

2.2.3.5 For new distribution substations, supply the information from the Load Serving Entity on the need and alternatives considered. Those issues include existing

conditions, voltage profiles, line capacities, outages, load growth, alternate substation feed pickup capability, etc.

This Application does not include a new distribution substation. Therefore, these studies are not applicable.

2.3 Local Transmission, Distribution and Distributed Resource Alternatives

2.3.1 Describe local transmission level alternatives that have been studied and rejected for the proposed project. Local transmission level alternatives can include but are not limited to:

An upgrade of existing transmission circuits with larger capacity conductors:
As noted, Xcel Energy considered rebuilding W3316 and W3351 in place to a higher voltage, but rejected the alternative because it did not solve reliability needs based on access or land rights.

Installation of capacitor banks:
This Project need is not driven by voltage support; therefore, new capacitor banks are not a feasible alternative.

Installation of new substation equipment:
Substation equipment installations would not solve any one of the three identified needs and was screened from consideration.

Smaller and less expensive line/s in other locations:
The project is the least cost line option to achieve system reliability. Building new lines elsewhere would not address the reliability issues with W3316 and W3351.

Distribution networking and upgrades:
The surrounding transmission area has a very large footprint, around 1800 square miles. Because the area is so large, it is not feasible to replace transmission lines which serve the local area distribution system with additional distribution networks.

Distributed resources, including solar and other distributed resources:

Using EMS data, Transmission Planning studied adding enough wind, solar and battery resources to the system in order to replace these two transmission lines. In order to achieve a reliability like that of the transmission lines, the amount of resources needed in the area would cost many times the project cost. Thus, this alternative was dismissed based on unreasonable costs and a high land use. More detailed analysis is available in the Transmission Planning Study in Appendix D.

2.3.2 Explain why the alternatives were not selected.

The Local Transmission, Distribution and Distributed Resource Alternatives are discussed in the section above 2.3.1 and the reasons why they were not selected are not repeated here. Ultimately, Xcel Energy concluded that no other option could cost effectively solve the issues experienced with lines W3351 and W3316.

2.4 Non-Transmission Options: Discuss the potential for non-transmission solutions to the identified problem, as prioritized in Wis. Stat. §§ 1.12(4) and 196.025(1)(ar).

Non-transmission alternatives were looked at for this application. Because Xcel Energy has a goal of 80% carbon reduction from 2005 levels by 2030 and 100% reduction by 2050, carbon-based resources were not studied. Below in section 2.4.1 a non-transmission option is discussed at a high level. For a more detailed look see the Transmission Planning Study in Appendix D.

2.4.1 Noncombustible renewable energy resources

Noncombustible renewable energy sources were examined as an option for a non-transmission alternative. To solve the issues experienced by the existence of W3351 and W3316, lines W3351 and W3316 would need to be retired to address the land rights issue. This would create a significant reduction in load serving capability, since the Ironwood area would be served by a radial line from near Ladysmith, Wisconsin. To provide alternative support, significant solar, wind and battery would need to be installed in the region in order to serve the local load for all scenarios. With W3351 and W3316 retired, the access, land rights and condition problems would be resolved. However, there would then be no transmission lines connecting Ashland and Ironwood and system resiliency would be substantially diminished. The result would be a system which would be much less reliable and more susceptible to forced load outages.

Based on a screening analysis included in the Transmission Planning Study, a similar level of reliability for the local Ironwood load could be met by installing at a minimum the following resources (see Table 2.4-1).

Table 2.4-1 Non-Wire Alternative Estimate

Resource	Amount	Cost
Solar Farm	312 MW	$240,240,000
Wind Farm	425 MW	$552,500,000
Battery Installation	1210 MWh	$302,500,000
Total Cost		**$1,095,240,000**

To achieve a similar level of reliability, the cost of the non-transmission alternative would be about 10 times higher than the proposed Project. For this reason, this alternative was dismissed from further consideration.

Refer to the Transmission Planning Study in Appendix D for more information on this alternative including the assumptions used in creating the resource estimates.

2.4.2 Combustible renewable energy resources

Currently, there is no planned new utility scale combustible renewable energy generation in the Ashland or Ironwood areas. Bay Front generation plant in Ashland Wisconsin is a renewable biofuel generator which serves the local region. A combustible renewable energy generator would not meet the three reliability needs.

2.4.3 Nonrenewable combustible energy resources in the following order:

2.4.3.1 Natural gas

As discussed above in section 2.4, because Xcel Energy has a goal of 80% carbon reduction from 2005 levels by 2030 and 100% reduction by 2050, carbon-based resources were not studied. There are no planned utility scale natural gas generating stations in the Ashland or Ironwood areas.

2.4.3.2 Oil or coal with a sulphur content of less than 1%

2.4.3.3 All other carbon-based fuels

As discussed above in section 2.4, because Xcel Energy has a goal of 80% carbon reduction from 2005 levels by 2030 and 100% reduction by 2050, carbon-based resources were not studied. There are no planned utility scale natural gas generating stations in the Ashland or Ironwood areas.

2.5 No-Build Options

The no-build option is the existing system base case in the Transmission Planning Study. The no-build option will leave the line in its current state. If this project is not completed, lines W3351 and W3316 will continue to deteriorate and the constrained access, and limited land rights issues would persist, reducing reliability in the Project area.

2.6 Energy Conservation and Efficiency and Load Response

Provide an analysis of the ability of energy conservation and efficiency and load response to reduce, alter, or eliminate the need for this project.

2.6.1 A description of the energy conservation and efficiency and load response programs and services available to customers in the project area

Focus on Energy is the statewide energy efficiency and renewable energy program in Wisconsin. Focus on Energy has residential and business programs that include providing incentives for customers to purchase energy efficient products or to use renewable resources. Customers can voluntarily choose to participate in these programs. Wisconsin's electric and gas utilities fund Focus on Energy through gas and electric rates.

2.6.2 An indication of the amount of additional energy efficiency and demand response, not already included in the forecast, needed to reduce, alter, or eliminate the need for this project.

Since the Project is driven by the age and condition, access and land rights, energy efficiency and load reduction is not a feasible option. The no-build option stated in Section 2.5 would not solve these current issues with this transmission line.

2.6.3 A discussion of the feasibility of achieving the level of energy efficiency and demand response identified in Section 2.6.2.

As noted in Section 2.6.2, no level of energy efficiency and demand response can meet the need for the Project.

2.7 For Market Efficiency Projects:

The proposed Project is not a Market Efficiency Project.

2.8 Modeling Information

2.8.1 For all projects submit network modeling information from PSSE or PowerWorld for steady-state power flow solutions. If submitting data from PSSE, submit the *.raw file. If submitting data from PowerWorld, submit the *.pwb file.

Power System Simulator for Engineering (PSS®E) models were used for analysis in the Planning Analysis. Data files for PSS®E reliability analysis supporting the Transmission Planning Study contained in Appendix D are provided separately with a request for confidentiality.

In the Ashland to Ironwood Transmission Planning Study (see Appendix D), the 2020 power flow models employed were developed by MISO. The base study model for this analysis was the 2025 summer peak model used in the 2020 MTEP Annual Assessment. The base model was then

modified to include the project changes as it pertains to each option. The program used for this analysis was PSS®E Version 34.

2.8.2 On an individual application basis, as requested by the assigned engineer, provide the computer network simulation(s) data input files, output files, and/or output summaries.

Xcel Energy provide Commission engineers with this information. Because the analysis and software are proprietary and confidential and contain Critical Energy/Electric Infrastructure Information, the data will be submitted with a request for confidential treatment.

2.9 Area Load Information

Submit historical peak load by substation for the study area for at least the past ten years. Explain each component with quantitative detail of the estimated forecasted need. Any changes in the projected growth rates over the forecast period should be fully explained. Area load information requirements will be discussed at the pre-application consultations. Based on the need and scope of the proposed project, different historical data may be required.

Table 2.9-1 shows the actual peak loads in the project area from 2017 to 2020 and the projected peak loads 2020-2030 which are based on the actual peak loads. While the Project will provide additional load-serving capability, it is important to note that this Project is not driven by projected non-coincident loads in the area. This Project is required because of the poor condition of the lines, inaccessibility of the corridor and land rights. These loads are provided for information only and have no bearing on the Project need.

Table 2.9-1 Actual and Projected Peak Loads

Loads (MW)	Actual Peak Loads		Projected Peak Loads						
	2017	2018	2019	2020	2021	2022	2024	2025	2030
Hurley	6.94	6.86	6.65	7.24	7.25	7.59	7.68	7.69	7.76
Upson	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
East Mellen	4.22	4.54	4.54	4.61	4.61	4.65	4.67	4.72	4.74
Minersville	1.53	1.53	1.53	1.54	1.54	1.54	1.54	1.54	1.54
Gingles	N/A	6.53	5.85	7.20	7.20	7.36	7.50	7.56	7.65
Bayfront	12.86	9.95	6.09	6.16	6.16	6.25	6.35	6.39	6.41
Second Street	8.66	8.67	8.32	8.78	8.78	8.87	9.69	10.85	10.87
Ironwood	3.10	3.27	3.00	3.37	3.37	3.46	3.55	3.56	3.61
TOTALS	**37.41**	**41.44**	**36.07**	**39.00**	**39.01**	**39.83**	**41.08**	**42.41**	**42.68**

2.10 Regional Transmission Organization Information

2.10.1 For regional projects, supply the cost benefit analysis and the likely cost allocation per the Midwest ISO's filings.

The proposed Project is not a regional project, so cost allocation does not apply.

2.10.2 Description of applicable transmission tariffs

The proposed Project is not a regional project; there are no applicable regional tariffs.

2.10.3 Provide transmission service agreements, if applicable.

This provision is not applicable to this proceeding.

3.0 MAGNETIC FIELDS

3.1 Submit the estimate magnetic field data in PSC Table 6

Estimated magnetic field data including the information described in items 3.1.1 – 3.1.4 (predominant line configurations, unique structure types, existing lines affected, and each circuit configuration) is included in Appendix E and has been submitted to the PSC in an electronic spreadsheet.

3.2 PSC Table 6 includes the following information in for each estimated magnetic field scenario.

Estimated magnetic field scenarios include estimates at 80 and 100 percent of peak load at 1 year and 10 years post-construction and current levels for those scenarios as required in items 3.2.1 and 3.2.2.

3.3 Provide all assumptions used to model magnetic field levels including:

Assumptions used to model the magnetic field levels including those listed in items 3.3.1 – 3.3.4 (phase ID and angles, pole diagrams, height of lowest conductor at mid-span) are included in the data provided in Appendix E and the information provide in the electronic spreadsheet.

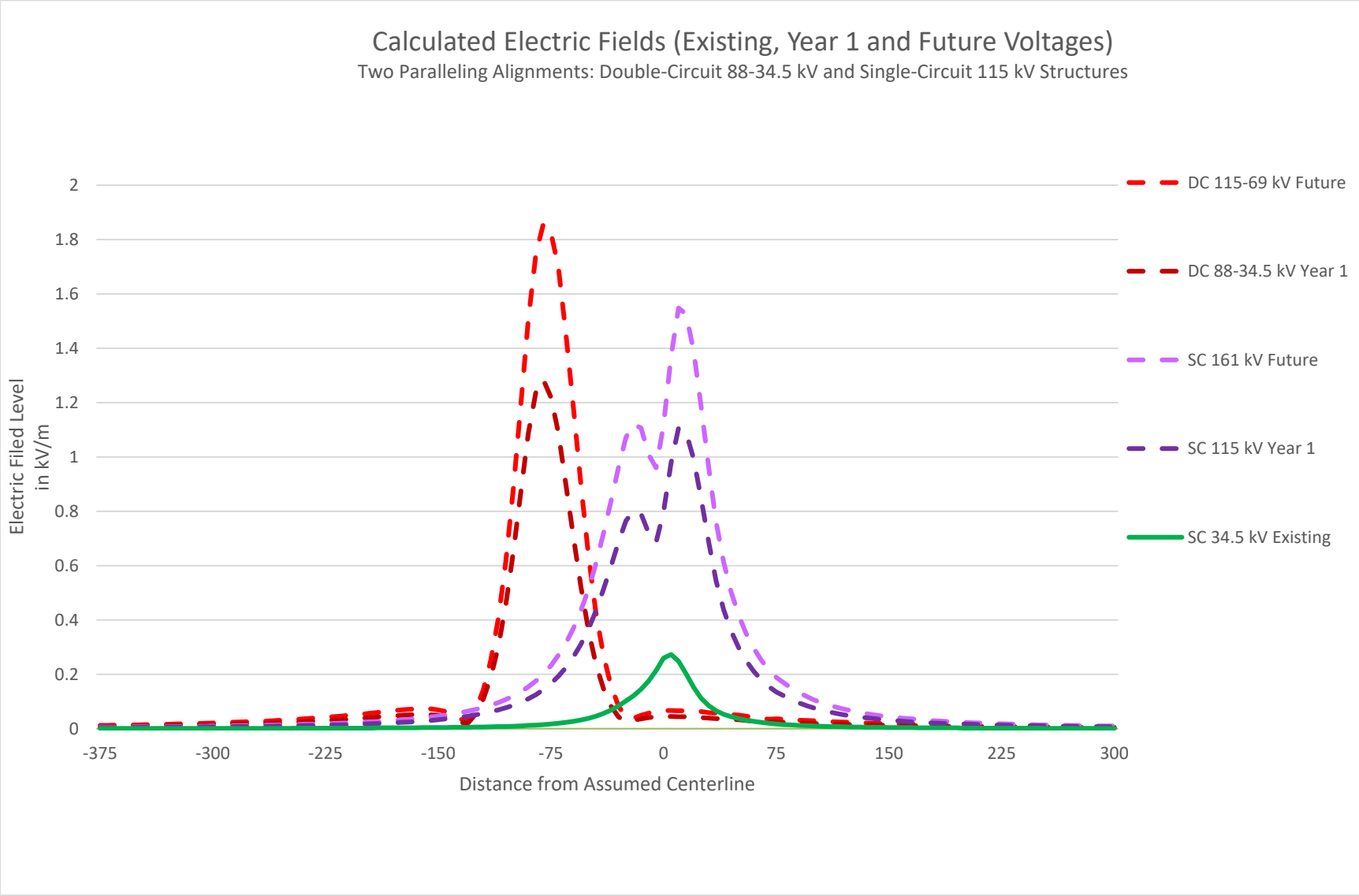
3.3.1.1 Electric and Magnetic Fields

EMF is an acronym for the terms electric and magnetic fields. For the lower frequencies associated with power lines (referred to as "extremely low frequencies"), EMF should be considered separately as electric fields (EFs) and magnetic fields (MFs), measured in kilovolts per meter (kV/m) and milliGauss (mG), respectively. EFs are dependent on the voltage of a transmission line and MFs are dependent on the current carried by a transmission line. The strength of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 Hertz (cycles per second).

3.3.1.2 Electric Fields

There is no federal standard for transmission line electric fields. Xcel Energy, however, has self-imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground. The standard was designed to prevent serious hazards from shocks when touching large objects parked under AC transmission lines of 500 kV or greater. Figure 3.3-1 provides the EFs at nominal conductor voltage for the proposed 34.5 kV transmission line. The maximum EF, measured at one meter (3.28 feet) above ground, associated with the Project is calculated to be 0.409 kV/m. As shown in Figure 3.3-1, the strength of EFs diminishes rapidly as the distance from the conductor increases.

Figure 3.3-1 Calculated Electric Fields (Existing, Year 1, and Future Voltages)



3.3.1.3 Magnetic Fields

There are presently no federal or Wisconsin regulations pertaining to MF exposure. The Applicant provides information to the public, interested customers and employees so they can make informed decisions about MFs. Such information includes the availability for measurements to be conducted for customers and employees upon request.

The magnetic field profiles around the proposed transmission lines for each structure and conductor configuration proposed for the Project are shown in Figures 3.3-2 and 3.3-3. Magnetic fields were calculated for normal system conditions (systems intact with projected load flows) for the 1st year of service and the 10th year of service. As projected for the planned in-service year of the Project or 2021. The magnetic field values are calculated at a point where the conductor is closest to the ground. The magnetic field profile data shows that magnetic field levels decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from source). The maximum MF, calculated at one meter (3.28 feet) above ground, associated with the double-circuit segments is calculated to be 28 mG at year 1 and 29 mG at year 10, these values occur at points directly underneath the transmission lines. The maximum MF, calculated at one meter (3.28 feet) above ground, associated with the single-circuit segments is calculated to be 16 mG at year 1 and 22 mG at year 10, these values occur at points directly underneath the transmission lines. Maximum values at the edge of the transmission line ROW and sample points beyond are shown here in Table 3.3-1.

Table 3.3-1 Maximum milliGauss (mG) Values at Specified Distances from Proposed Transmission Lines [1]

	Max. Level	25' from lines	150' from lines	300' from lines
Year 1				
Double Circuit 88 kV / 34.5 kV (Appendix C, Figure 9)	28	21	1.5	0.4
Single Circuit 115 kV (Appendix C, Figure 7)	20	14	1.0	0.2
Year 10				
Double Circuit 88 kV / 34.5 kV (Appendix C, Figure 9)	29	22	1.5	0.4
Single Circuit 115 kV (Appendix C, Figure 7)	22	15	2.2	0.3

[1] Values shown are for the predominate structure type and alignment (paralleling lines with 75 foot spacing between lines). Values for all structure types and alignments are provided in Appendix E.

The magnetic field produced by the transmission line is dependent on the current flowing on its conductors. Actual current flow on the line will vary throughout the day, so magnetic fields will

be less than these projected upper levels during most hours of the year with short intermittent instances of levels reaching these calculated forecasts.

Figure 3.3-2 Calculated Magnetic Fields (Existing and Year 1)

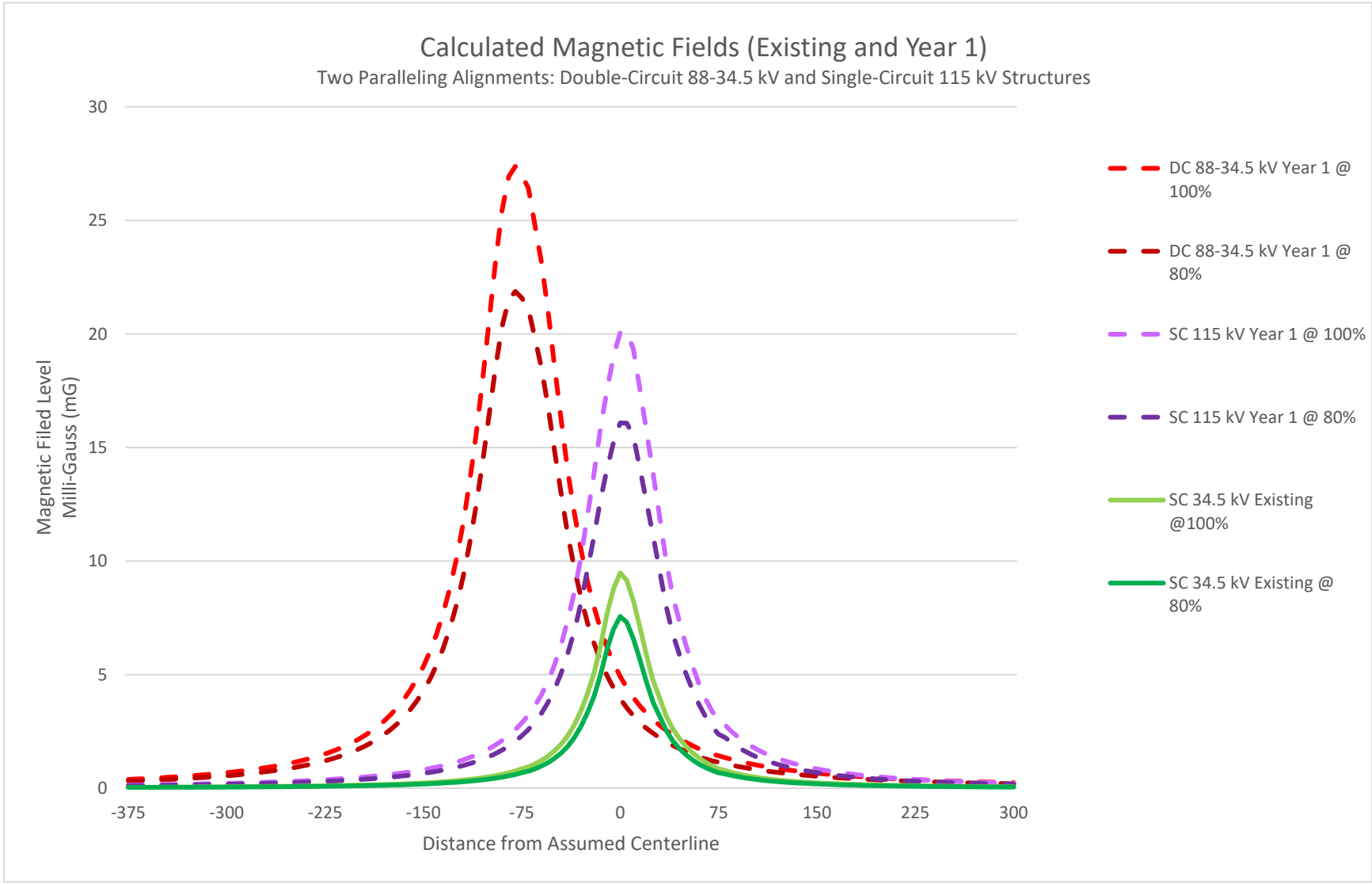
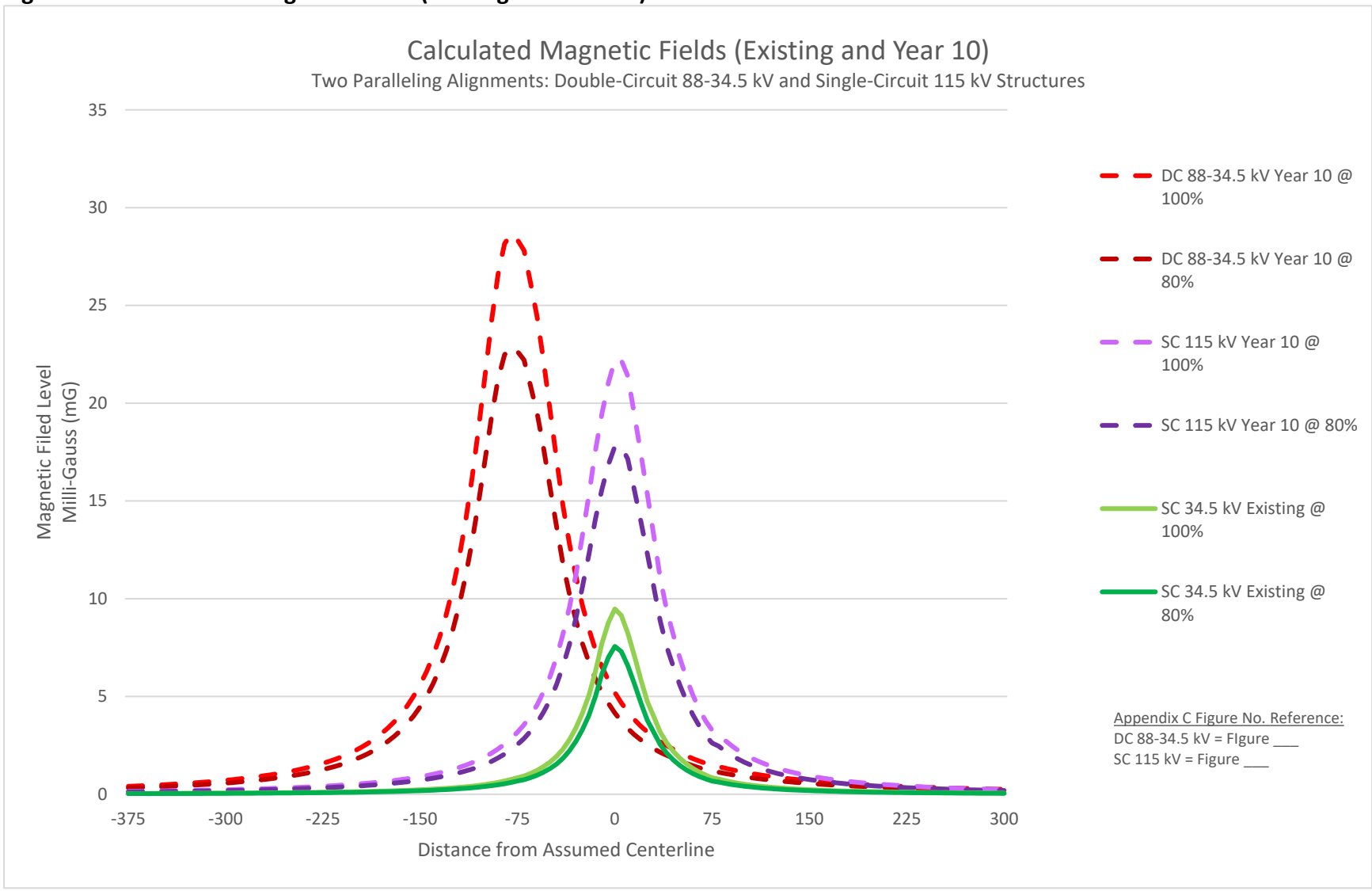


Figure 3.3-3 Calculated Magnetic Fields (Existing and Year 10)



Appendix E contains data tables showing the specific EF and MF calculations shown in Figures 3.3-2 and 3.3-3.

3.3.1.4 Detailed Magnetic Field Profiles

Detailed magnetic field profiles have been calculated for each line and included in Appendix E. This includes data for each unique structure type or configuration and each existing line that would be affected by the proposed transmission line. The tables include magnetic field scenarios and expected current levels for the proposed lines at 80% and 100% of peak load for 1 year post-construction and 10 years post-construction. The data has been provided to the Commission in an electronic spreadsheet. Larger versions of the summary charts shown above are included in Appendix E.

4.0 PROJECT COSTS

Estimated Project costs are shown in Table 4.1-1 below and reflect total project cost for each of the five route options and associated costs for portions of the Project to be completed in Wisconsin and Michigan. Project costs included in the below table include: installation and removal costs of transmission lines and distribution costs; substation upgrades; precertification costs, contingency reserve, and Allowance for Funds Used During Construction. Project costs identified are in 2021 dollars and includes an average of 2.4% escalation for anticipated costs when installation is complete in 2026 and removals complete in 2028.

Estimated costs for construction of new lines and the removal of existing facilities are based on Xcel Energy historical data for similar 161 kV, 115 kV, 69 kV transmission and distribution projects. The development of project cost estimates also included on-the-ground site visits of the route alternatives with representatives from civil and line construction, vegetation management, siting and land rights, engineering and project management, as well as desktop reviews.

For the estimate, Xcel Energy identified key known factors that could result in additional costs. Xcel Energy also sought to identify potential unknown risks given the scope of the Project, its duration and specific construction circumstances. The Project will involve constructing three separate transmission lines of approximately 50 miles over a longer than typical duration—from construction of new lines, removal of old lines and restoration, could take up to eight years and the removals will require coordination with the Bad River Band. Estimated project costs therefore, includes contingency reserve for cost as impacts due to weather; unknown subsurface soil/rock conditions; possible alignment alterations; railroad license agreement negotiations; market factors that affect material price and delivery; and restoration of disturbed areas due to construction of new transmission lines and removal of existing transmission lines.

4.1 Transmission Line Route Cost Estimate Table

Table 4.1-1 Transmission Line Route Cost Estimates (dollars are in thousands)

	Route A			Route B			Route C			Route D			Route E		
Project Component	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***
Line Installation															
115 kV Line W3316 (161 kV capable)	13,000	22,000	12,000	13,000	19,000	11,000	12,000	20,000	11,000	13,000	21,000	11,000	13,000	22,000	12,000
88 kV Line W3351 (115 kV capable)	16,000	21,000	8,000	14,000	20,000	8,000	16,000	20,000	8,000	16,000	20,000	8,000	16,000	20,000	8,000
34.5 kV Line W3606 (69 kV capable)	2,000	2,000	900	2,000	3,000	1,000	1,000	2,000	800	2,000	2,000	900	2,000	2,000	900
34.5 kV Line W3607 (69 kV capable)	2,000	2,000	1,000	2,000	2,000	1,000	2,000	2,000	1,000	2,000	2,000	1,000	2,000	2,000	1,000
Xcel Energy Distribution	100	600	100	100	600	100	100	600	100	100	500	100	100	400	100
Bayfield Electric Distribution[2]	0	0	100	0	0	100	0	0	100	0	0	200	0	0	100
High Voltage Transmission Impact Fees	---	---	9,000	---	---	8,000	---	---	9,000	---	---	9,000	---	---	9,000
Line Removal															
W3316 115 kV Removal	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000
W3351 88 kV Removal	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000
W3606 34.5 kV Removal	0	700	200	0	700	200	0	700	200	0	700	200	0	700	200
W3607 34.5 kV Removal	0	800	100	0	800	100	0	800	100	0	800	100	0	800	100
Xcel Energy Distribution Removal	0	100	20	0	100	20	0	100	20	0	100	20	0	100	20
Bayfield Electric Distribution Removal	---	---	20	---	---	30	---	---	20	---	---	50	---	---	20

Table 4.1-1 Transmission Line Route Cost Estimates (dollars are in thousands)

Project Component	Route A			Route B			Route C			Route D			Route E		
	Materials	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***
High Voltage Transmission Impact Fees	---	---	100	---	---	100	---	---	100	---	---	100	---	---	100
Salvage Value															
W3316 Salvage	-200	---	---	-200	---	---	-200	---	---	-200	---	---	-200	---	---
W3351 Salvage	-70	---	---	-70	---	---	-70	---	---	-70	---	---	-70	---	---
W3606 Salvage	-50	---	---	-50	---	---	-50	---	---	-50	---	---	-50	---	---
W3607 Salvage	-90	---	---	-90	---	---	-90	---	---	-90	---	---	-90	---	---
Xcel Energy Distribution Salvage	-10	---	---	-10	---	---	-10	---	---	-10	---	---	-10	---	---
Line Costs Total	**33,000**	**52,000**	**35,000**	**31,000**	**49,000**	**33,000**	**31,000**	**50,000**	**33,000**	**31,000**	**50,000**	**34,000**	**32,000**	**51,000**	**35,000**
Substation															
Bayfront Substation - Relay Settings	---	20	---	---	20	---	---	20	---	---	20	---	---	20	---
Gingles Substation - Relay Settings	---	30	---	---	30	---	---	30	---	---	30	---	---	30	---
Hurley Substation - Relay Settings	---	20	---	---	20	---	---	20	---	---	20	---	---	20	---
Ironwood Substation - Relay Settings	---	30	---	---	30	---	---	30	---	---	30	---	---	30	---
Norrie Substation - Relay Settings	---	20	---	---	20	---	---	20	---	---	20	---	---	20	---
Substation Costs Total	**0**	**100**	**0**	**0**	**100**	**0**	**0**	**100**	**0**	**0**	**100**	**0**	**0**	**100**	**0**
OTHER PROJECT COSTS															
Pre-certification Costs	3,000			3,000			3,000			3,000			3,000		
Contingency / Risk Reserve	14,000			14,000			14,000			14,000			9,000		

Table 4.1-1 Transmission Line Route Cost Estimates (dollars are in thousands)

Project Component	Route A			Route B			Route C			Route D			Route E		
	Materials	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***	***Materials***	***Labor***	***Other***
Operations & Maintenance (O&M)	0			0			0			0			0		
AFUDC	2,000			2,000			2,000			2,000			2,000		
Other Costs Total	**19,000**			**19,000**			**19,000**			**19,000**			**14,000**		
Project Cost - Wisconsin	137,000			129,000			131,000			133,000			130,000		
Project Cost - Michigan	2,000			2,000			2,000			2,000			2,000		
TOTAL PROJECT COSTS	**139,000**			**131,000**			**133,000**			**134,000**			**132,000**		

[1]Other costs include Escalation, Overheads, and Miscellaneous Costs (such as snow plowing, rock excavation, temporary bypass lines, electrical interference studies, etc.).
[2]Other costs include installation of new underground distribution lines, transformers, and secondary lines.

To assess project costs and constructability of the route options, the project team performed multiple field reviews of the route options. The costs provided in the table above reflect the best estimates that can be derived at this stage of the project. The team also had to make certain assumptions based on the best information currently available including removal of lines W3351, W3316 and W3606 will occur via helicopter in years 2027-2028 after the new lines are in service.

Upon route determination from the Public Service Commission, Xcel Energy will conduct additional field reviews and update project costs based on the permitted route.

5.0 ROUTE INFORMATION

5.1 Factors considered in the applicant's evaluation of potential routes and locations for the transmission line and its associated facilities.

Xcel Energy identified general potential route corridors between established end points meeting the routing priorities defined in Wis. Stat. § 1.12(6). To develop the five routes, Xcel Energy utilized a stepwise process which included consultation with the PSC, the WDNR, the Bad River Band, WisDOT, Enbridge Energy, and the CN railroad. The Company also relied heavily on the public participation process as described in Section 7.0, and the transmission line siting priorities established by the state of Wisconsin (see Section 5.1.3).

5.1.1 Identify route(s) that were considered and explain why those corridors were or were not chosen.

During initial route development Xcel Energy looked at multiple routes and route segment options for the new transmission lines. Because of the steep terrain and the number of streams and rivers throughout much of the Project area there are few existing linear corridors to follow between the Gingles and Ironwood substations. Some routes were considered early in the process but were eliminated prior to conducting detailed analysis because desktop analysis identified less impacting route alternatives. Xcel Energy used desktop mapping with available geographic data of environmental and infrastructure features as well as aerial photos to develop and evaluate initial routes. Field reviews were also conducted to better understand on the ground conditions for some of these routes. Appendix I provides a table that describes each route and route segment evaluated and the reason why it was not selected to include in this Application.

After evaluation of all of the options described above and shown in Appendix A, Figure 3 Xcel Energy selected the five routes as proposed route alternatives.

5.1.2 Describe the use of any weighting criteria used to evaluate potential routes.

No quantitative weighting criteria were used to evaluate potential routes. The route selection process is a multi-step analysis that emphasizes identifying route alternatives with minimal impacts to the human and natural environment. Preliminary routes are initially developed in a GIS map where we begin to evaluate alternatives for potential impacts to human settlement and the environmental setting, including, but not limited to:

- Natural resource/environmental impacts (waterways, wetlands, forest clearing, soils and steep slopes, archaeological sites, protected species)
- Route corridor sharing opportunities (existing corridors, highways and roads, recreational trails, section lines or field lines)

- Affected landowners (proximity to residences, permanent and temporary easements needed, tree clearing near homes, impacts to agricultural lands)
- Aesthetics (type, height, number and size of poles, visual appearance, tree clearing)
- Public/protected lands (type of ownership and protection, designated uses, ability to get approval to cross)
- Constructability issues (outage risk, worker safety, construction vehicle access routes, engineering constraints)
- Estimated cost

Route alternatives are typically eliminated from more detailed evaluation if the overall impacts clearly are substantially greater than other alternatives (see Section 5.1.1 above). Of those remaining, each alternative route will typically have different types and quantities of expected impacts which can make direct comparisons difficult. For example, one route may require many acres of tree clearing while an alternative may have much less clearing, but be located near more homes. The Project team works together to identify potential routes based on which routes, on balance, solves the electrical need, are the least impactful, and most cost effective.

The Applicant conducted field reviews of the route options including environmental, construction, engineering, and routing staff, to better understand site conditions. In addition to understanding the scope of natural resource impacts, these field reviews helped confirm landowner impacts and opportunities to share corridor with existing roads and distribution lines, as well as how to best avoid impacts to homes and the environment.

5.1.3 Describe how the transmission line siting priorities in Wis. Stat. § 1.12(6) were considered.

As required by Wis. Stat. § 1.12(6), Xcel Energy sought to develop routes that "to the greatest extent feasible that is consistent with economic and engineering considerations, reliability of the electric system, and protection of the environment", using the following corridors, "in order of priority"

- existing utility corridors;
- highway and railroad corridors;
- recreational trails to the extent the facilities may be constructed below ground and do not significantly impact environmentally sensitive areas; and
- new corridors.
- The five proposed routes all substantially follow existing utility corridors (distribution and transmission), roads/highways, and railroads.

Table 5.1-1 Percentage of Existing Corridors Followed by Route					
Corridor Type	**Route A**	**Route B**	**Route C**	**Route D**	**Route E**
Highway	1%	31%	3%	2%	0%
Railroad	3%	6%	2%	3%	3%
Existing Utility	80%	60%	89%	78%	81%
Greenfield	15%	3%	6%	15%	16%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

5.2 Changes to Existing Easements

If the proposed project contains segments that share part or all of an existing transmission easement submit the following for each of those segment(s):

5.2.1 Describe changes to the location or width of existing electric easements.

Xcel Energy currently maintains an existing 34.5 kV Transmission Line that follows near Highway 13 between Ashland and Mellen (Line W3606), along with an existing 34.5 kV Transmission Line that follows near Highway 77 between Mellen and Ironwood (Line W3607). The proposed route segments provide opportunities to corridor share with the 34.5 kV Transmission Line existing easements. Those easements vary in width between 20 feet and 100 feet with portions that overhang the CN railroad. Xcel Energy anticipates obtaining new transmission easements for construction of new facilities.

5.2.2 Provide the results of the analysis of existing transmission easements that would be shared by application routes and the potential problems that may be encountered.

Existing W3606 and W3607 line segments were originally constructed between 1976 and 1978 by LSDP. LSDP acquired easements in 1960s, some were not recorded. In the 1970s, LSDP filed an Admission of Notice of Construction with the Register of Deeds. The Notice of Construction described a singular line that differed from the LSDP easements. The LSDP easements provide the utility with the following conditions: the perpetual right and easement to construct, maintain, inspect, remove from, rebuild, replace, and operate across the premises hereinafter described, a line or lines of wires for transmission and/or distribution of electric energy and for the private telephone service of the grantee, including all supports, poles and/or structures, wires, guys, anchors, fixtures, appliances and other equipment which the grantee shall deem necessary, over, across, and upon said premises and to carry electric energy thereon.

The existing License Agreement with CN railroad is voltage limited to 69 kV and is subject to relocation and removal of the facilities.

Xcel Energy holds existing easements though Copper Falls State Park for the 34.5 kV line. These easement rights will not be used for the Project because the W3606 line is being relocated.

5.2.3 State if the existing easements are to be renegotiated and/or rewritten. If so, indicate the reason (for example language modernization, change in easement size, change in transmission, etc.).

Xcel Energy intends to acquire new easements for the Project. The existing easements vary in specificity and widths, which widths would be inadequate for the Project. These easements would comply with Wis. Stat. § 182.017(7), the Landowner Bill of Rights, which applies to lines greater of 100 kV or more.

5.3 Route Segments

Route descriptions for the five proposed routes are included below. Information for Sections 5.3.1 to 5.3.6 are included within the descriptions.

5.3.1 Type and dimensions of structure and foundation (such as underground/overhead, single-pole/H-frame, direct embed/concrete caisson, type of material, average span length, etc.).

The Applicant performed initial engineering with preliminary pole spotting to develop structure types, configurations, and quantities required for each section of line in all five route options. Typical structure drawings can be found in Appendix C. All structures are proposed to be weathering steel finish, but Xcel Energy requests that the Commission grant the flexibility to use wood poles for tangent structures if the price of steel continues to be inflated and wood is determined to be a more cost-effective option at the time of ordering materials.

A majority of the structures on the Project (approximately 80%) will be direct-embed monopole structures. Most tangent structures that are single-circuit or double-circuit would be direct-embed. Steel culverts with a 48-inch diameter will be installed below grade, as necessary, to prevent the excavated hole from caving during construction. Embedment depths for the direct embed poles are anticipated to be 10% of overall pole length plus 4 feet. Embedment depths would range 10 feet to 15 feet.

A minority of the structures on the Project (approximately 20%) will be self-supporting monopole structures. All angle and deadend structures would be self-supporting. All triple-circuit structures would be self-supporting. A few tangent structures that are single-circuit and double-circuit may be self-supporting. The reinforced concrete pier caissons are expected to be approximately 7 feet diameter by 36 feet below ground. The piers would have a 1 foot reveal above ground line.

Approximately 18 structures will be either H-frame or 3-pole single-circuit structures with horizontal wire configurations used for long span crossings. The Project requires a 1,600 foot crossing over the White River valley south of Ashland, and a 800 to 1,100 foot crossing of Krause Creek area located on the east side of the railroad tracks, east of Golf Couse Road, north of Mellen. These structures will likely be in-line deadend structures 75 to 125 feet tall above ground

and use reinforced concrete pier caisson foundations. H-frames will allow for longer span lengths without creating taller structures due to the horizontal configuration of the phase conductors.

The Project may require a limited number of down-guyed angle or deadend structures, that are not self-supporting. Final engineering will determine which structures require down guys.

Either single-circuit monopole or single-circuit H-frame structure types may be used on the Project's eastern end to rebuild pole-for-pole inside the existing ROW corridor between Hurley and Ironwood Substations, where existing H-frame single-circuit 115 and 88 kV structures are already located.

Single-circuit monopole tangent and light angle structures will predominantly be in a delta configuration. When the ROW corridor width is limited, the single-circuit tangent and light angle structures may be in a vertical configuration (all one side). Single-circuit medium angle, large angle, and deadend structures will be in a vertical configuration. Double-circuit medium angle, large angle, and deadend structures will also be in a vertical configuration.

Monopole structure heights above ground are expected to range 60 to 100 feet for single-circuit, 75 to 110 feet for double circuit, and 105 to 140 feet for triple-circuit configuration. Span lengths would approximately 350 feet with distribution underbuild or approximately 650 feet without distribution underbuild. A majority of the structures on the Project (approximately 90%) will be without distribution underbuild.

Monopole structures will likely use steel davit arms with suspension polymer I-string insulators and deadend glass bell insulators as the first choice. Alternatively, polymer braced horizontal line post (two-part) insulators may be used for structures with roadside access or narrow ROW corridors. The Applicant prefers davit arms because they offer maintenance crews more flexibility (than braced post insulators) in remote access areas where bucket trucks do not have year-round access. Davit arms with V-string insulators may be required in remote access areas with narrow ROW corridor or nearby existing buildings.

For double-circuit monopole structures, the Applicant proposes a symmetrical poletop design with matching insulator sizes on both sides of the pole. The insulator lengths for the lower voltage would purposely be upsized to match the insulator lengths of the higher voltage. The Applicant proposes this to reduce the likelihood of lightning flashovers causing more frequent momentary outages of the lower voltage circuit with shorter insulators.

Switch structures are not proposed on the 115 kV W3316 (designed to 161 kV standards) and 88 kV W3351 (designed to 115 kV standards). Switch structures will be required on 34.5 kV W3606 and 34.5 kV W3607 (both designed to 69 kV standards). The switches would be either 1-way or 3-way 69 kV phase-over-phase switches. In corridors where working room and clearances are limited, the switches may be low-profile distribution-type 1-way 34.5 kV platform switches (not built to 69 kV standards). The switch structures will likely be self-supporting weathering steel

monopole structures 60 to 110 feet tall above ground and use reinforced concrete pier caissons. Alternatively, the switch structures may use laminated wood pole direct-embed structures.

The Applicant prefers steel poles that prevent woodpecker holes, bear damage, and ground line insect damage and decay/rot. However, if the year 2021 increasing costs of steel pole materials continues to rise and is considered no longer economical by Xcel Energy, round wood poles may be substituted for tangent direct-embed structures with a single-circuit or double-circuit configuration.

Along existing 34.5 kV W3607 there is an existing 9.6-mile segment of fiber-reinforced polymer poles that were rebuilt in year 2012. The Project conservatively proposes to remove them. Future engineering by Xcel Energy will determine if these poles (designed for single-circuit 69kV on top with a 34.5 kV underbuild) can be reframed and used as a single-circuit 115 kV pole for the Project.

A preliminary geotechnical evaluation (field review) has not been conducted. Based on the Applicant's legacy knowledge of soil types along existing 34.5 kV W3606 and W3607, we are anticipating hard shallow rock in the Mellen area and also between Upson and Ironwood. This will impact foundation design whereas some reinforced concrete pier caisson designs could be shortened to rock sockets that toe into competent rock. The plan for direct-embed poles is to get them down to full embedment depth.

5.3.2 Transmission configuration (single-circuit, double-circuit, etc.).

See above section 5.3.1.

One of the Applicant's objectives is to keep the 115 kV W3316 (designed to 161 kV standards) and 88 kV W3351 (designed to 115 kV standards) circuits on separate structures for the entire project route, as much as possible. The existing system is configured this same way, using separate single-circuit structures, and this benefits the Applicant by providing system operations with greater flexibility and the line maintenance workers with increased safety for future activities such as shield wire or structure replacement. As noted above in Section 1.6.6, the Applicant prefers to limit (minimize) the amount of triple circuit configuration on the Project. Therefore, the use of 161/115/69 kV triple-circuit is viewed as the least preferred option to minimize the new ROW corridor while avoiding impacts to existing homes and cabins that would be in very close proximity to the selected route.

5.3.3 Conductor and shield wire information (for example size, voltage, etc.).

The Project's transmission lines will be designed for and energized at three different voltages.

The Applicant proposes a single (non-bundled) 397.5 thousand of circular mils (kcmil) aluminum conductor steel reinforced (ACSR) 26/7 "Ibis" Twisted Pair (TP) conductor for all 161 kV W3316 and 115 kV W3351 phase wires. The "Ibis" TP conductor has a 795 kcmil equivalent size.

The Applicant proposes a single (non-bundled) 397.5 kcmil ACSR 26/7 "Ibis" TP conductor or a single (non-bundled) #4/0 ACSR 6/1 "Penguin" TP conductor for 69 kV W3606 and W3607 phase wires. The "Penguin" TP conductor has a 423 kcmil equivalent size.

The Project may require replacement of multiple short spans of existing transmission line taps that are attached to existing 34.5 kV W3606 and W3607 single circuit lines. Final engineering will determine which existing spans may require modifications and/or replacement. These are very small projects (mostly 1-span replacement). The Applicant proposes to either match the existing wire sizes found on these existing 34.5 kV tap lines, or upsize to a single (non-bundled) 477 kcmil ACSR 26/7 "Hawk" round smooth conductor or a single (non-bundled) #4/0 ACSR 6/1 "Penguin" TP conductor for these tap lines.

The Applicant proposes TP conductors to minimize the possibility of wire galloping events during winter weather events. Alternatively, round smooth conductors may be used on circuits where the likelihood of galloping is lower.

The Applicant proposes a single shield wire atop each monopole structure. One monopole structure alignment would carry a 48-count fiber optical ground wire (OPGW). The second monopole structure alignment would install either a 3/8-inch EHS 7-strand steel shield wire or another 48-count OPGW. Dual shield wires would be used on H-frame and 3-pole structures with phase conductors in horizontal configuration.

The Applicant proposes the Xcel Energy-owned distribution underbuild on transmission structures would use a single 336 ACSR 18/1 "Merlin" conductor for each phase. The distribution neutral wire would be either a single 336 ACSR 18/1 "Merlin" wire (for longer spans) or a 2/0 ACSR 6/1 "Quail" wire (for shorter spans).

Aside from segments of Xcel Energy-owned distribution underbuild, the Project does not propose any foreign-utility owned underbuild attachments such as communications (cable TV or phone).

5.3.4 Existing transmission lines affected by proposed project.

The Project does not affect any transmission lines owned by other utilities. All existing transmission lines listed below are owned, operated, and maintained by Xcel Energy.

The Project removes and relocates and/or rebuilds segments of these existing transmission lines:

- For all five route options, relocate and remove approximately 27 miles of the existing single circuit 88 kV W3351 transmission line between Structure 33 located southeast of Ashland and Structure 255 at the Saxon Pumping Station Tap located east of Saxon. This includes removal of approximately 12.8 miles through the Bad River Reservation.

- For all five route options, rebuild, in the existing corridor, approximately 2 miles of the existing single circuit 88 kV W3351 transmission line between Structure 315 located west of Hurley and Structure 336 near the Ironwood Substation.

- For all five route options, relocate and remove approximately 32 miles of the existing single circuit 115 kV W3316 transmission line between Structure 43 located southeast of Ashland and Structure 255 located west of Hurley. This includes removal of approximately 12.6 miles through the Bad River Reservation.

- If Route Option A is selected, rebuild, in the existing corridor, approximately 1.4 miles of the existing single circuit 115 kV W3316 transmission line between Structure 259 at the Hurley Substation and Structure 270 at the Ironwood Substation. Also relocate and remove approximately 0.4 miles of the existing single circuit 115 kV W3316 transmission line between Structure 256 located west of Hurley and Structure 259 at the Hurley Substation.

- If Route Options B, C, D, or E are selected, rebuild, in the existing corridor, approximately 1.8 miles of the existing single circuit 115 kV W3316 transmission line between Structure 256 located west of Hurley and Structure 270 at the Ironwood Substation.

- Rebuild, depending on final route, approximately 17 miles of the existing single circuit 34.5 kV W3606 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 169 located southeast of Ashland and Structure 440 located east of Golf Course Road north of Mellen.

- For all five route options, relocate and remove approximately 3.4 miles of the existing single circuit 34.5 kV W3606 transmission line between Structure 441 located east of Golf Course Road north of Mellen and Structure 495 within the Mellen city limits. This includes removal of approximately 1.8 miles through the Copper Falls State Park.

- If Route Options A, B, or C are selected, rebuild approximately 0.5 miles of the existing single circuit 34.5 kV W3606 transmission line to double circuit 115/69 kV or single circuit 69 kV between Structures 496 and 503 located within the Mellen city limits.

- If Route Options D or E are selected, relocate and remove approximately 0.5 miles of the existing single circuit 34.5 kV W3606 transmission line between Structure 496 and 503 located within the Mellen city limits.

- Rebuild, depending on final route, approximately 26 miles of the existing single circuit 34.5 kV W3607 transmission line to either double circuit 115/69 kV, double circuit 161/69 kV, single circuit 161 kV, single circuit 115 kV, or single circuit 69 kV between Structure 34 located within the Mellen city limits and Structure 463 at the Ironwood Substation.

Depending on the final route, the Project may require modifications or replacement of multiple structures and spans of existing transmission line taps that are adjacent and attached to existing 34.5 kV W3606 and W3607 single circuit lines. Final engineering will determine which existing adjacent structures may require modifications and/or replacement. These are very small projects (mostly 1-pole and 1-span replacement) with relatively minor costs which are accounted for as part of the Project contingency reserve.

Tables 5.3-1 and 5.3-2 below summarize the existing transmission line segments affected by the Project.

Table 5.3-1 Xcel Energy-Owned Transmission Lines to be Rebuilt in Existing Corridor

Location	Approx. Circuit Length in Miles				
	Route A	**Route B**	**Route C**	**Route D**	**Route E**
115 kV W3316 Str 256 to 259	---	0.4	0.4	0.4	0.4
115 kV W3316 Str 259 to 270	1.4	1.4	1.4	1.4	1.4
88 kV W3351 Str 315 to 336	2	2	2	2	2
34.5 kV W3606 Str 169 to 440	17	17	17	17	17
34.5 kV W3606 Str 496 to 503	0.5	0.5	0.5	---	---
34.5 kV W3607 Str 34 to 463	26	26	26	26	26
Subtotal (miles)	**46.9**	**47.3**	**47.3**	**46.8**	**46.8**
115 kV W3324 Str 1 Hurley Tap	0.1	0.1	0.1	0.1	0.1
88 kV W3353 Str 1 Saxon Pump Tap	0.05	0.05	0.05	0.05	0.05
34.5 kV W3606 Str 3006 East Mellen Tap	0.05	---	---	0.05	0.05
34.5 kV W3607 Str 239A Bjork Sawmill Tap	0.05	0.05	0.05	0.05	0.05
34.5 kV W3608 Str 1 to 3 Park Falls Tap	0.1	0.1	0.1	---	---
34.5 kV W3626 Str 1A Weber Lake Tap	0.05	0.05	0.05	0.05	0.05
34.5 kV W3628 Str 382 Superior Falls Tap	0.05	0.05	0.05	0.05	0.05
34.5 kV W3631 Str 2 to 9 Ironwood Tap Phase Wires only on W3607 Host Strs	0.3	0.3	0.3	0.3	0.3
34.5 kV W3632 Str 2 DPC Kimball Tap	0.05	0.05	0.05	0.05	0.05
Subtotal (miles)	**0.8**	**0.75**	**0.75**	**0.7**	**0.7**
Total (miles)	**47.7**	**48.05**	**48.05**	**47.5**	**47.5**

Table 5.3-2 Xcel Energy-Owned Transmission Lines to be Removed (Not Rebuilt)					
	Approx. Circuit Length in Miles				
Location	Route A	Route B	Route C	Route D	Route E
115 kV W3316 Str 43 to 255	32	32	32	32	32
115 kV W3316 Str 256 to 259	0.4	---	---	---	---
88 kV W3351 Str 33 to 255	27	27	27	27	27
34.5 kV W3606 Str 441 to 465	1.6	1.6	1.6	1.6	1.6
34.5 kV W3606 Str 466 to 495 Convert to Distribution Only	1.8	1.8	1.8	1.8	1.8
34.5 kV W3606 Str 496 to 503 Convert to Distribution Only	---	---	---	0.5	0.5
Total (miles)	**62.8**	**62.4**	**62.4**	**62.9**	**62.9**

5.3.5 Existing distribution lines affected by the proposed project.

Several existing distribution lines along the proposed route will require rebuilding or relocation along the selected route. Tables 5.3-3 and 5.3-4 below summarize the affected distribution lines by route option. For the lines owned by Xcel Energy, most of the existing lines are underbuild on existing 34.5 kV W3606 and W3607 structures. The Applicant's preference is to rebuild all transmission circuits overhead with distribution underbuild on the new transmission structures. For the lines owned by Bayfield Electric Cooperative, all of their existing lines follow corridors that do not share ROW with any existing transmission lines. The Applicant has discussed the Project's impacts with Bayfield Electric Cooperative, and it is the Cooperative's preference for existing overhead distribution facilities to be removed and relocated underground at the edges of the new transmission corridors.

Table 5.3-3 Xcel Energy-Owned Distribution Lines to be Rebuilt as Underbuild

Location	Approx. Circuit Length in Feet				
	Route A	**Route B**	**Route C**	**Route D**	**Route E**
Underbuild on W3606 Structures 289 to 318 from Schiestl Rd (Marengo) to Minersville	7,700	7,700	7,700	7,700	7,700
Underbuild on W3606 Structures 322 to 369 from Minersville to Lohman Rd (High Bridge)	14,300	14,300	14,300	14,300	14,300
Underbuild on W3606 Structures 369 to 388 from Lohman Rd to Hwy C (High Bridge)	5,300	5,300	5,300	5,300	---
Highway C east-west (Marengo) from Railroad Tracks to Minersville Rd	1,000	---	---	---	---
Underbuild on W3606 Structures 495 to 499 from E Tyler Ave to Olson Rd (Mellen)	900	900	900	---	---
Underbuild on W3606 Structures 499 to 503 from Olson Rd (Mellen) to East Mellen Tap	---	1,000	1,000	---	---
Underbuild on W3607 Structures 37 to 59 from Lumber Company to Hwy 77 (Mellen)	7,000	6,700	6,700	---	---
Underbuild on W3607 Structures 59 to 106 from Hwy 77 (Mellen) to east of DPC Morse	14,400	14,400	14,400	14,400	14,400
Underbuild on W3607 Structures 235 to 239 along Upson Park Rd (Upson)	1,300	1,300	1,300	1,300	1,300
Sessions Ave (Upson)	---	---	---	900	---
Odanah Rd (Hurley)	1,200	---	---	---	---
Total (feet)	**53,100**	**51,600**	**51,600**	**43,900**	**37,700**
Total (miles)	**10.1**	**9.8**	**9.8**	**8.4**	**7.2**

Table 5.3-4 Bayfield Electric Coop-Owned Distribution Lines to Be Relocated Underground					
	Approx. Circuit Length in Feet				
Location	Route A	Route B	Route C	Route D	Route E
Highway C east-west (High Bridge) from Honkanen Rd to Government Rd	2,600	---	---	2,600	---
Highway C north-south (High Bridge) 2,600 ft south of Delafield Rd	2,600	---	---	---	---
Delafield Rd, Seaquist Rd, and Davis Rd from Hwy C to Coria Rd	---	---	---	15,500	---
Davis Rd (High Bridge) 1,000 ft north of Coria Rd	---	---	---	---	1,000
Highway 13 (High Bridge) from Hwy C to Golf Course Rd	---	15,500	---	---	---
Golf Course Rd (Mellen) 3,500 ft north and 700 ft south of Hwy 13	---	---	4,200	---	---
Golf Course Rd (Mellen) from Hwy 13 to Gilgen Rd	7,000	---	7,000	7,000	7,000
Total (feet)	**12,200**	**15,500**	**11,200**	**25,100**	**8,000**
Total (miles)	**2.3**	**3.0**	**2.1**	**4.8**	**1.5**

5.3.6 Shared ROW configuration.

Details for All Five Routes

The five proposed routes are similar with local differences in routing around small cities/towns and configurations of the circuits. Xcel Energy analyzed the data in this Application based segments of the routes broken down by these small cities (referred to as "city segments"). The following discussion provide a description and comparison of the routes by city segment. Table 5.3-5 includes the different structure types for the various line configurations proposed for the Project.

Table 5.3-5 Description of Proposed Structures and Circuit Configurations)

Circuit Configuration	Structure Types			Conductor Type	Distance by Route (miles)[1]				
	Material	Approx. Height (above ground)	Construction Method		A	B	C	D	E
Single Circuit Transmission (161, 115, and 69 kV)	Corten weathering steel	60’ to 95’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	46.5	44.1	44.6	46.9	49.1
Single Circuit Transmission (161, 115, and 69 kV) with Distribution Underbuild	Corten weathering steel	70’ to 100’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	9.8	9.3	9.6	8.2	6.8
Single Circuit Transmission (161, 115, and 69 kV) with Distribution Underground buried nearby	Corten weathering steel	60’ to 95’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	1.3	2.9	2.1	1.3	1.3
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV)	Corten weathering steel	75’ to 105’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	43.5	44.4	43.4	41.7	44.8
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV) with Distribution Underbuild	Corten weathering steel	80’ to 110’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	-	0.2	-	-	0.2
Double Circuit Transmission (161/69 kV, 115/69 kV, and 161/115 kV) with Distribution Underground buried nearby	Corten weathering steel	75’ to 105’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	1.0	-	-	3.5	0.2

Table 5.3-5 Description of Proposed Structures and Circuit Configurations)

Circuit Configuration	Structure Types			Conductor Type	Distance by Route (miles)[1]				
	Material	Approx. Height (above ground)	Construction Method		A	B	C	D	E
Triple Circuit Transmission (161/115/69 kV)	Corten weathering steel	105’ to 135’	Conventional	A single 397.5 ACSR 26/7 “Ibis” Twisted Pair per phase	0.7	0.1	0.7	0.7	0.7
Distribution Underbuild on Transmission Structures	N/A	N/A	N/A	A single 336.4 ACSR 18/1 “Merlin” per phase	0.1	0.2	0.1	<0.1	<0.1
Total Transmission Miles					**102.9**	**101.2**	**100.5**	**102.3**	**103.2**

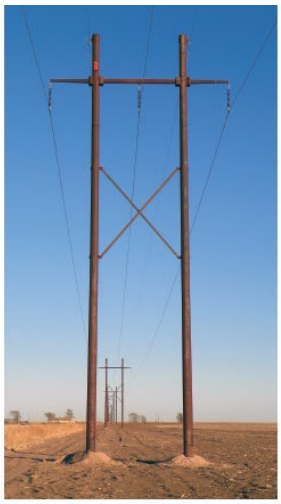
[1] Transmission miles are provided for comparison amongst routes. Because all routes generally have two corridors between the same end points, geographic miles are not provided.

Figures 5.3-1 and 5.3-2 show the typical structure types and circuit configurations proposed for the Project.

Figure 5.3-1 Typical Single Circuit Structure Design Type

Braced horizontal post insulators

Davit arms with i-string suspension insulators



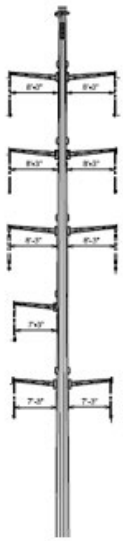
H-frame with i-string suspension insulators

Braced horizontal post insulators with Distribution Underbuild

Figure 5.3-2 Typical Multi-Circuit Structure Design Type

Double Circuit
braced post insulators

Double Circuit
Davit arms with suspension insulators
and Distribution Underbuild



Triple Circuit
Davit arms with
suspension insulators

Figure 1 of Appendix A and the sections below show a side-by-side comparison of each route between Ashland, Minersville, Highbridge, Mellen, Gile, and Ironwood.

5.3.6.1 Ashland (Structure W3316-42 along Pearce Road) to Minersville

Route A

The 161 kV single circuit line is proposed in the existing 34.5 kV corridor and the 115/69 kV double circuit line is proposed parallel to the east side of the 161 kV line. All lines would parallel the east side of the CN railroad for approximately 8.3 miles from Pearce Road located southeast of Ashland to Schiestl Road located north of Marengo. Note that for the White River crossing, Xcel Energy proposes three parallel single circuit crossings due to the terrain and span length. South of this river crossing, the 115/69 kV double circuit lines continue. At Schiestl Road immediately north of Marengo, the 69 kV line leaves the 115 kV line and becomes a 161/69 kV double circuit line that bypasses the town of Marengo on the west side (State Highway 13 and Van De Bruggen Road before turning east on Highway C to the west side of Minersville). The 115 kV single circuit line adds distribution underbuild and continues in the existing 34.5 kV corridor along Ensinger Road and parallel to the east side of the railroad to the intersection of Highway C and Ensinger Road immediately east of Minersville.

Route B

All three lines follow the same route as Route A from Structure W3316-42 until immediately after the White River crossing, when the 115/69 kV double circuit line continues southeast in the existing 34.5 kV corridor and parallel to the east side of the railroad tracks to Schiestl Road. The 161 kV single circuit line travels south along the east side of State Highway 13 to the intersection with Schiestl Road. At Schiestl Road, the 69 kV line with distribution underbuild follows Ensinger Road to the Minersville Substation before crossing to the west side of the railroad tracks and Highway C. At Schiestl Road, Xcel Energy would build a new 0.15-mile 115 kV segment west to State Highway 13 where the 115 kV will double circuit with the 161 kV line bypassing Marengo on the west side in the same configuration as the 161/69 kV line.

Route C

All three lines have the same configuration (double circuit 115/69 kV and paralleling single circuit 161 kV) as Route A to Schiestl Road. At Schiestl Road, the 115 kV line continues along Ensinger Road to Highway C with distribution underbuild and the 161/69 kV are double circuited, also following Ensinger Road. In this route, there is no bypass on the west side of Marengo like Routes A and B. Instead for Route C, all lines would run through Marengo.

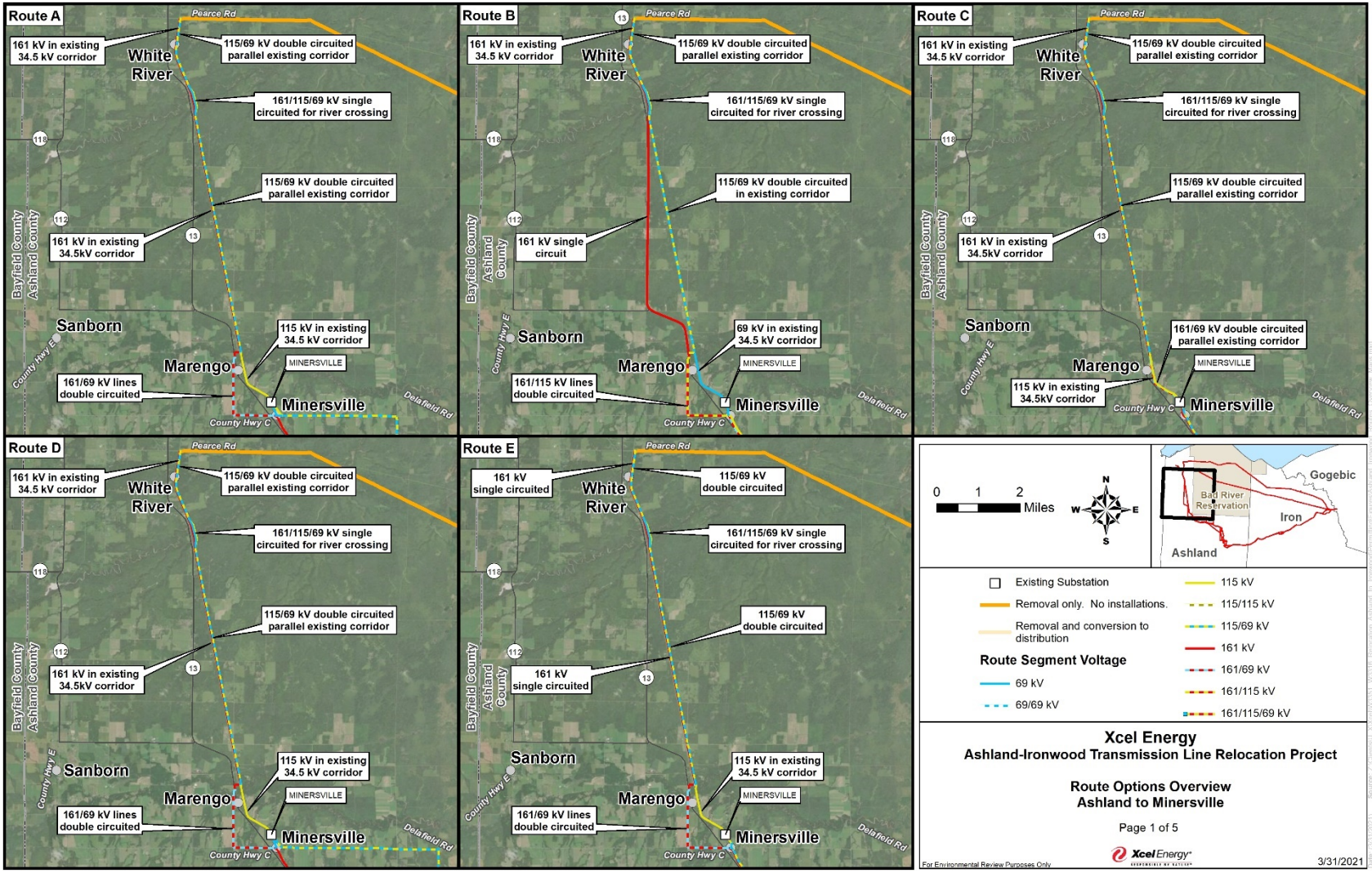
Route D

Route D is the same as Route A between Ashland and Minersville.

Route E

Route E is the same as Route A and D between Ashland and Minersville, except it is located completely outside of CN railroad ownership/easement.

Figure 5.3-3 Ashland to Minersville Route Options Overview



5.3.6.2 Minersville to Highbridge

Route A

From Minersville, the 161 kV single circuit line with distribution underbuild continues east and southeast in the existing 34.5 kV corridor and parallel to the north side of the railroad tracks (parallel to and north of Highway 13) to Highbridge while the 115/69 kV double circuit lines follow east and south along Highway C to the town of Highbridge.

Route B

From Minersville, the 115 kV single circuit line with distribution underbuild continues east and southeast in the existing 34.5 kV corridor and parallel to the north side of the railroad tracks to the town of Highbridge while the 161/69 kV double circuit lines occupies the narrow strip of land paralleling the south side of the railroad tracks and the north side of Highway 13 to the town of Highbridge.

Route C

From Minersville, both the 115/69 kV double circuit line and 161 kV single circuit line with distribution underbuild would follow and parallel, respectively, the existing 34.5 kV corridor along the north side of the railroad to Loham Road, approximately one mile west of Highbridge. At Lohman Road, the 115/69 kV double circuit line would turn north and then east along Poor Farm Road and south on Highway C while the 161 kV single circuit line with distribution underbuild would continue in the existing 34.5 kV corridor paralleling the north side of the railroad to Highway C.

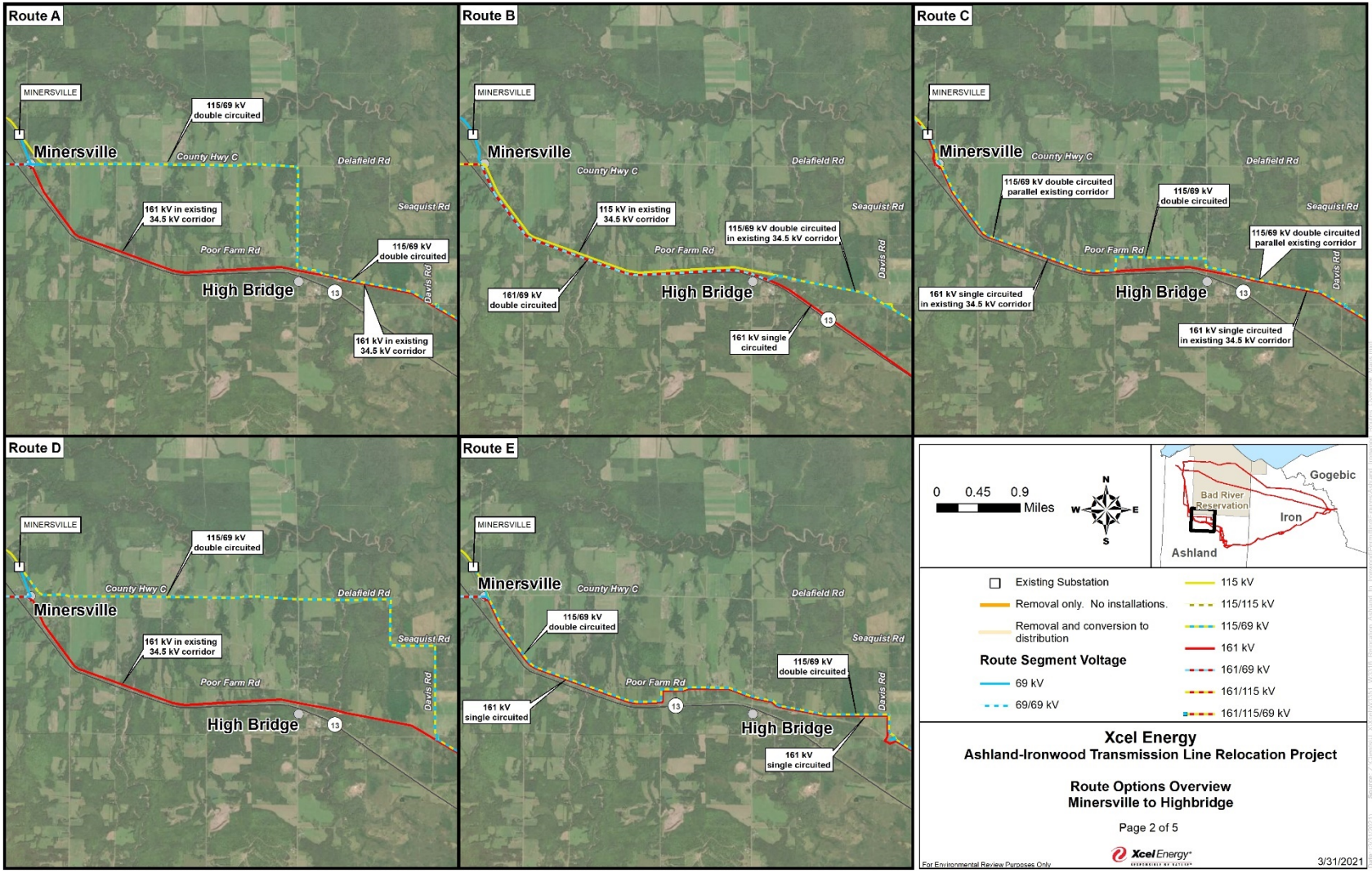
Route D

From Minersville, the 115/69 kV double circuit line would follow Highway C east and then east on Delafield Road, south on Delafield Road, east on Seaquist Road, and south on Davis Road to the Highbridge Substation (note: this route segment bypasses the town of Highbridge) while the 161 kV single circuit with distribution underbuild continues east and southeast in the existing 34.5 kV corridor and parallel to the north side of the railroad tracks (parallel to and north of Highway 13) to Highbridge.

Route E

Route E is similar to Route C between Minersville and Highbridge, except it is located completely outside of CN railroad ownership/easement. Also, at Lohman Road where the 161 kV single circuit line with distribution underbuild portion of Route C continues along Highway 13 following the existing 34.5 kV corridor, both the 161 kV single circuit line and 115/69 kV double circuit lines for Route E turns north on Lohman Road to follow Poor Farm Road to Highway C at Highbridge.

Figure 5.3-4 Minersville to Highbridge Route Options Overview



5.3.6.3 Highbridge to Mellen

Route A

From Highbridge, the 161 kV single circuit line continues southeast in the existing 34.5 kV corridor and the 115/69 kV double circuit lines would parallel the north side of the 161 kV line, both on the north side of the railroad tracks, to where the railroad turns due south on the east side of Golf Course Road (Structure W3606-441). From this structure, all three lines continue south on the east side of the railroad tracks and outside of the existing 34.5 kV corridor, with three parallel single circuit lines used for the crossing of Krause Creek, again due to terrain and span length. South of the Krause Creek crossing, the 115/69 kV line is again double circuit and 161 kV line runs parallel both crossing the railroad tracks and Highway 13 to parallel Golf Course Road south to just past Gilgen Road before turning east in a new corridor to the west side of Highway 13. At the intersection of Highways 13 and 169 on the north side of Mellen, both the 115/69 kV double circuit lines and 161 kV single circuit line travel east and south, crossing the Bad River within the Mellen city limits. For all routes, between existing 34.5 kV W3606 Structures 441 and 465 (north of Mellen), Xcel Energy proposes to completely remove the existing 34.5 kV line. Also for all routes, between existing 34.5 kV W3606 Structures 466 and 495 (in Mellen), Xcel Energy proposes to remove the existing 34.5 kV top circuit only while the pole bottoms and distribution underbuild would remain.

Route B

From Highbridge, the 115/69 kV double circuit line would run southeast in the existing 34.5 kV corridor to Structure W3606-441 east of Golf Course Road where the lines separate to two parallel single circuit lines to cross Krause Creek and return to the double circuit configuration after the river crossing before crossing the railroad tracks and Highway 13 at its intersection with Highway C while the 161 line parallels the north side of Highway 13 before crossing to the south side of the highway at Golf Course Road and continues on the south side of the Highway 13 to its intersection with Highway C. From the intersection of Highways 13 and C, both the 115/69 kV double circuit lines and 161 kV single circuit line parallel each other on the west side of Highway 13 south to Mellen. Note there is one short (approximately 400 feet) segment on the west side of Highway 13 that will be triple circuited due to a narrow ROW and residence. At the intersection of Highways 13 and 169 on the north side of Mellen, both the 115/69 kV double circuit lines and 161 kV single circuit line travel east and south, crossing the Bad River within the Mellen city limits. Route B is the same as all routes between existing 34.5 kV W3606 Structures 441 and 495 (north of Mellen).

Route C

From Highbridge, the 161 kV single circuit line continues southeast in the existing 34.5 kV corridor and the 115/69 kV double circuit line would parallel the north side of the 161 kV line, both on the north side of the railroad tracks. The 115/69 kV double circuit line continues southeast to Structure W3606-441 east of Golf Course Road where the lines separate to two parallel single

circuit lines to cross Krause Creek and return to the double circuit configuration after the river crossing before crossing the railroad tracks and Highway 13 at its intersection with Highway C and continues on the west side of Highway 13 to Mellen while the 161 kV line turns south along Golf Course Road to just past Gilgen Road before turning east in a new corridor to the west side of Highway 13 and continues south along Highway 13 parallel the 115/69 kV line on the west side of Highway 13. At the intersection of Highways 13 and 169 on the north side of Mellen, both the 115/69 kV double circuit lines and 161 kV single circuit line travel east and south, crossing the Bad River within the Mellen city limits. Route C is the same as all routes between existing 34.5 kV W3606 Structures 441 and 495 (north of Mellen).

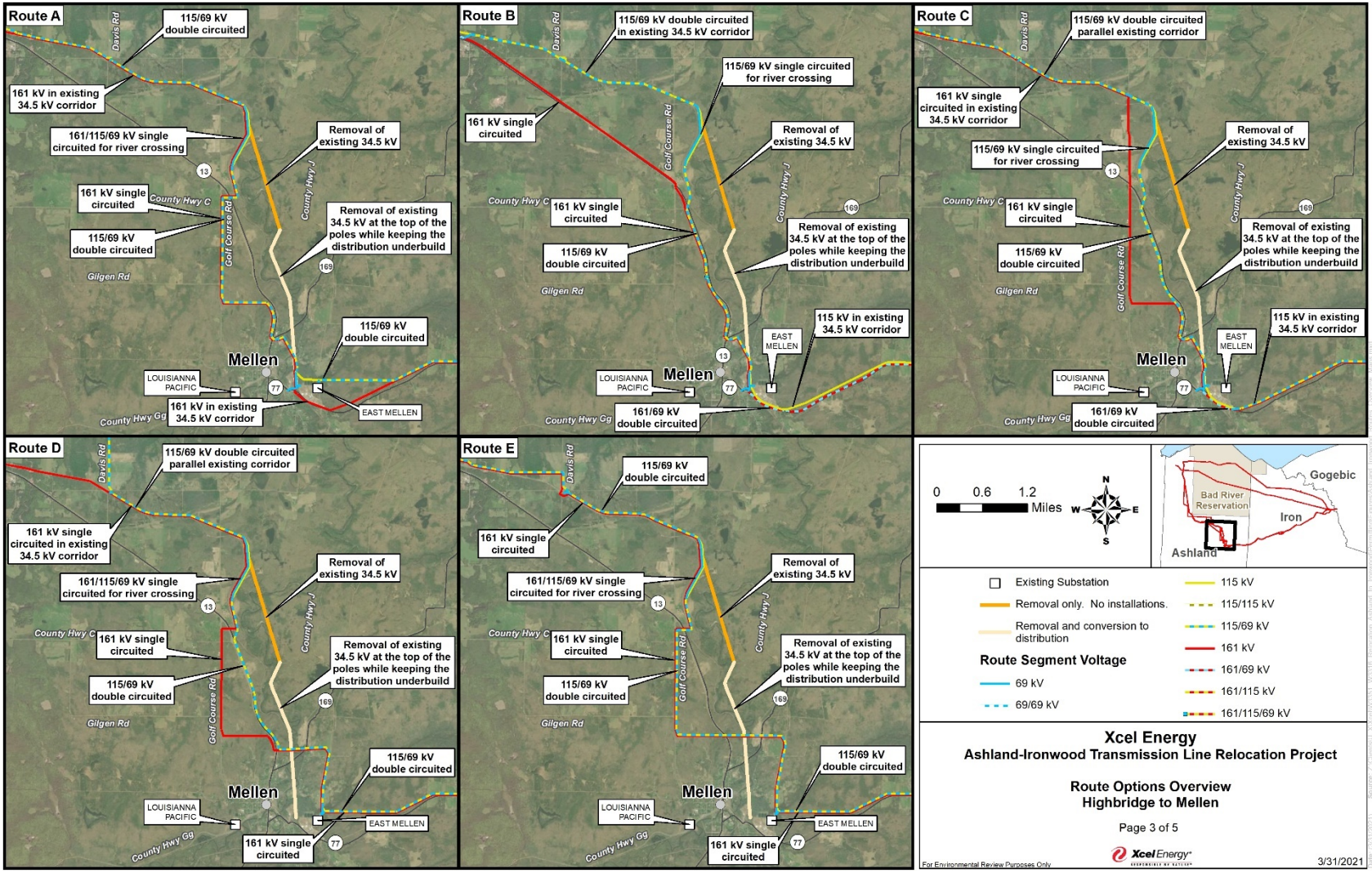
Route D

From Highbridge, the 161 kV single circuit line continues southeast in the existing 34.5 kV corridor and the 115/69 kV double circuit lines would parallel the north side of the 161 kV line, both on the north side of the railroad tracks, to where the railroad turns due south on the east side of Golf Course Road (Structure W3606-441). From this structure, all three lines continue south on the east side of the railroad tracks and outside of the existing 34.5 kV corridor, with three parallel single circuit lines used for the crossing of Krause Creek, again due to terrain and span length. South of the Krause Creek crossing, the 115/69 kV line is again double circuit and 161 kV line runs parallel both crossing the railroad tracks and Highway 13 to parallel Golf Course Road. The 161 kV line continues south on the east side of Golf Course Road to just past Gilgen Road before turning east in a new corridor to the west side of Highway 13 and continues south along the west side of Highway 13. After crossing the railroad tracks, the 115/69 kV double circuit line parallels the east side of Highway 13. At one quarter mile north of the Highways 13 and 169 intersection on the north side of Mellen, both the 115/69 kV and 161 kV lines travel east along a proposed pipeline corridor and then south along an existing pipeline corridor, while avoiding the Mellen city limits. Route D is the same as all routes between existing 34.5 kV W3606 Structures 441 and 495 (north of Mellen).

Route E

Route E is the same as Route A except it is located completely outside of CN railroad ownership/easement from Highbridge to where the railroad turns due south on the east side of Golf Course Road (Structure W3606-441). Then Route E follows Route A until Highway 13 where Route E continues east across Highway 13, the Bad River, and Highway 169 before turning south at North Butler Road and continuing south along an existing pipeline corridor, while avoiding the Mellen city limits. Route E is the same as all routes between existing 34.5 kV W3606 Structures 441 and 495 (north of Mellen).

Figure 5.3-5 Highbridge to Mellen Route Options Overview



5.3.6.4 Mellen to Gile

Route A

On the east side of Mellen, the 161 kV with distribution underbuild follows the existing 34.5 kV corridor east generally parallel to the north side of State Highway 77 while the 115/69 kV double circuit turns east in a new corridor immediately north of the East Mellen Substation for approximately one mile before paralleling the 161 kV line. The distribution underbuild drops off the 161 kV line at one half mile east of DPC Morse Substation. The 161 kV and 115/69 kV lines parallel each other on the north side of State Highway 77 through Tyler Forks, Rouse and to Upson. For Route A, Xcel Energy proposes three short (approximately 400, 2,200, and 1,100 feet) triple circuit segments due to proximity of residences along Highway 77. At Upson, both lines remain inside and parallel to the existing 34.5 kV corridor on the north side of Upson (no longer parallel to State Highway 77). Just west of Upson, distribution underbuild joins the 161 kV line for one quarter mile. Just east of Upson, both the 161 kV and 115/69 kV lines continue east in and immediately adjacent to the existing 34.5 kV corridor along State Highway 77 to the Iron Belt Substation before bypassing the town of Iron Belt on the south side, Pence on the north side, Montreal on the north side, and into Gile.

Route B

On the east side of Mellen, the 115 kV with distribution underbuild line follows the existing 34.5 kV corridor east generally parallel to the north side of State Highway 77 through Tyler Forks, Rouse and to Upson while the 161/69 kV line is in a new corridor generally on the south side of State Highway 77 through Tyler Forks, Rouse, and to Upson. The distribution underbuild drops off the 115 kV line at one half mile east of DPC Morse Substation. For Route B, there are no proposed triple circuit segments. At Upson, the 115/69 kV line bypasses Upson on the north side of town and the 161 kV line bypasses Upson on the south side of town adjacent to the south side of State Highway 77. Just west of Upson, distribution underbuild joins the 115/69 kV line for one quarter mile. Just east of Upson, both the 161 kV and 115/69 kV lines continue east on either side of State Highway 77 to the Iron Belt Substation before bypassing the town of Iron Belt on the south side, Pence on the north side, Montreal on the north side, and into Gile.

Route C

On the east side of Mellen, the 161 kV with distribution underbuild and 115/69 kV lines follow the existing 34.5 kV corridor east generally parallel to the north side of State Highway 77 through Tyler Forks, Rouse and to Upson. The distribution underbuild drops off the 161 kV line at 0.5 mile east of DPC Morse Substation. For Route C, Xcel Energy proposes three short (approximately 400, 2,200, and 1,100 feet) triple circuit segments due to proximity of residences along Highway 77. At Upson, both lines remain inside and parallel to the existing 34.5 kV corridor on the north side of Upson (no longer parallel to State Highway 77). Just west of Upson, distribution underbuild joins the 161 kV line for one quarter mile. Just east of Upson, both the 161 kV and 115/69 kV lines continue east in and immediately adjacent to the existing 34.5 kV corridor along

State Highway 77 to the Iron Belt Substation before bypassing the town of Iron Belt on the south side, Pence on the north side, Montreal on the north side, and into Gile.

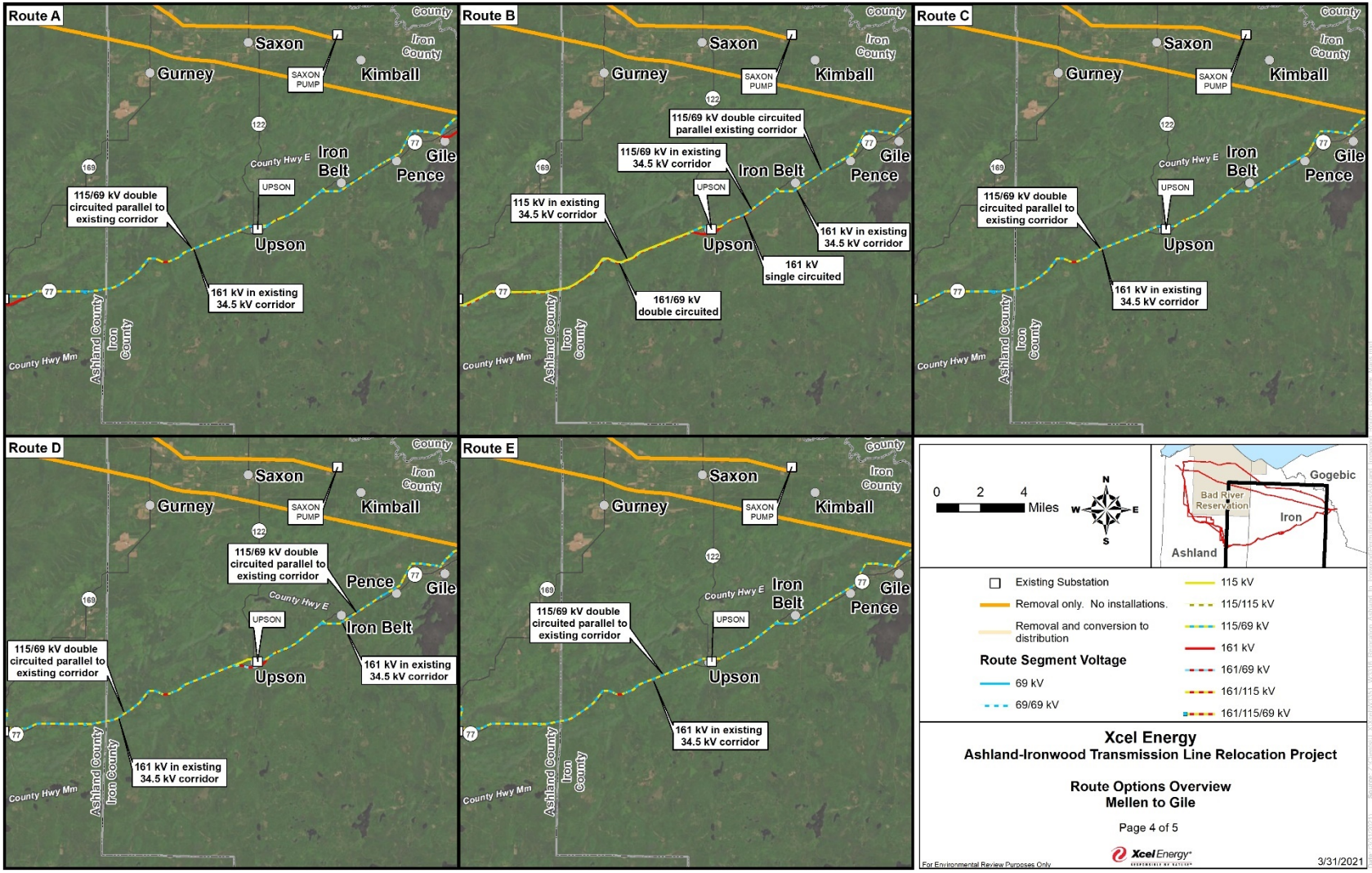
Route D

On the east side of Mellen, the 161 kV with distribution underbuild follows the existing 34.5 kV corridor east generally parallel to the north side of State Highway 77 while the 115/69 kV double circuit turns east in a new corridor immediately north of the East Mellen Substation for approximately one mile before paralleling the 161 kV line. The 161 kV and 115/69 kV lines parallel each other on the north side of State Highway 77 through Tyler Forks, Rouse and to Upson. The distribution underbuild drops off the 161 kV line at one half mile east of DPC Morse Substation. For Route D, Xcel Energy proposes three short (approximately 400, 2,200, and 1,100 feet) triple circuit segments due to proximity of residences along Highway 77. At Upson, the 115 kV line bypasses Upson on the north side of town and the 161/69 kV line bypasses Upson on the south side of town adjacent to the south side of State Highway 77. Just west of Upson, distribution underbuild joins the 115 kV line for one quarter mile. Just east of Upson, both the 161 kV and 115/69 kV lines continue east in and immediately adjacent to the existing 34.5 kV corridor along State Highway 77 to the Iron Belt Substation before bypassing the town of Iron Belt on the south side, Pence on the north side, Montreal on the north side, and into Gile.

Route E

Route E is the same as Route D from Mellen to Gile, except at Upson where Route E is the same as Route C.

Figure 5.3-6 Mellen to Gile Route Options Overview



5.3.6.5 Gile to Ironwood

Route A

From the west side of Gile, east of the West Fork Montreal River, the 115/69 kV double circuit continues east in the existing 34.5 kV corridor on the north side of State Highway 77 and Gile to Hurley before the 115 kV/69 kV lines separate; the 115 kV line will be rebuilt in the existing 88 kV corridor and the 69 kV line follows the existing 34.5 kV corridor. Both lines run east through the south side of Hurley and into the Ironwood Substation (approximately half mile east of the Montreal River and into Michigan). The 161 kV line runs on the south side of Gile in an abandoned transmission corridor to the Hurley Substation before changing voltages to 115 kV and follows an existing 115 kV corridor east to the Ironwood Substation.

Route B

From the west side of Gile, east of the West Fork Montreal River, the 115/69 kV double circuit continues east in the existing 34.5 kV corridor on the north side of State Highway 77 and Gile to Hurley before the 115 kV/69 kV lines separate; the 115 kV line will be rebuilt in the existing 88 kV corridor and the 69 kV line follows the existing 34.5 kV corridor. Both lines run east through the south side of Hurley and into the Ironwood Substation (approximately half mile east of the Montreal River and into Michigan). The 161 kV line continues east parallel to the south side of the 115/69 kV line to the Hurley Substation before changing voltages to 115 kV and follows an existing 115 kV corridor east to the Ironwood Substation.

Route C

Route C is the same as Route B between Gile and Ironwood.

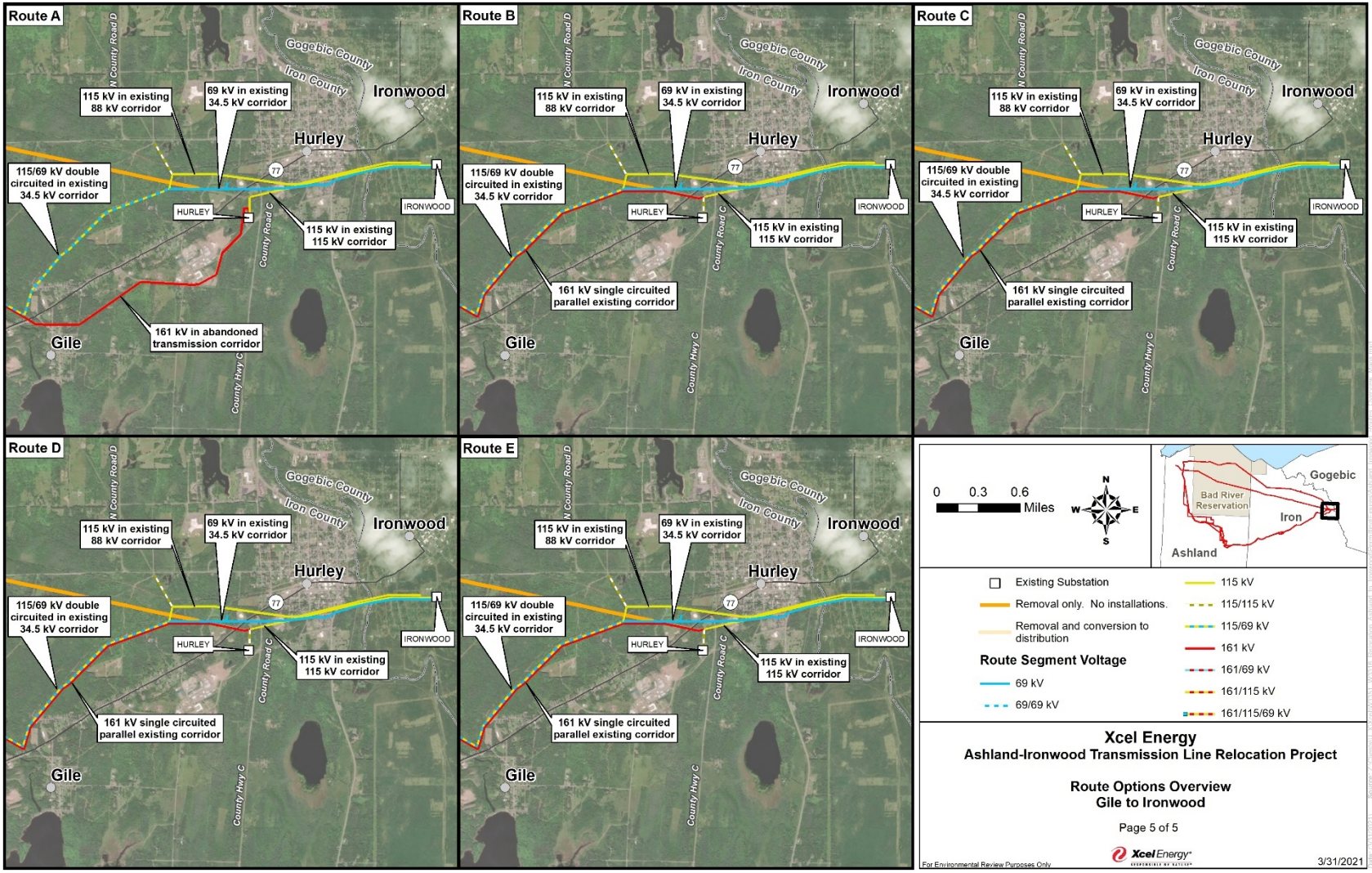
Route D

Route D is the same as Route B between Gile and Ironwood.

Route E

Route E is the same as Route B between Gile and Ironwood.

Figure 5.3-7 Gile to Ironwood Route Options Overview



5.4 PSC Impact Tables

Route impact tables, which quantify the general impacts of constructing the transmission line, have been prepared for each route. These tables are included in Appendix B and summarize impacts associated with the proposed transmission line corridor. Off-ROW access will be required in certain locations to construct the route. Land cover impacts associated with off-ROW access are provided in Section 5.7. Information regarding the type and date of source data is included with each table. Copies of each table have also been provided to Commission staff in Microsoft Excel spreadsheet format.

Below is a list of the impact tables included:

- Table 1 – General Route Impacts;
- Table 2 – Land Cover;
- Table 3 – Federal, State, Local, and Tribal Lands excluding ROWs;
- Table 4 – Sensitive Receptors;
- Table 5 – Residential Buildings;
- Table 6 – Magnetic Field Data (included as Appendix E); and
- Table 7 – Route Impact Summaries.

An outline of the methods used to prepare the impact tables and a summary of the results for each route is presented below.

The information contained in these tables was developed using a combination of sources including available reference data, aerial photography, and field survey and observations along accessible segments. These sources were utilized to measure and calculate impacts using GIS software.

The reference data utilized include county tax parcel data obtained from the Wisconsin Statewide Parcel Data (V6) in October 2020; databases from the State of Wisconsin regarding the locations of schools, daycares, and hospitals; state managed lands information from the WDNR; U.S. Fish and Wildlife Service (USFWS) cadastral data; and U.S. Geological Survey (USGS) Gap Analysis Program (GAP) land cover data. Sources of aerial photography ranged from 2018-2020.

Field observation of the routes included wetland determination and waterway surveys completed between May and June 2019.

5.4.1 General Route Impacts

More detailed line items for General route impacts are listed in Appendix B, Table 1.

Methods

The type and extent of existing ROW was determined from Xcel Energy's existing easements, aerial photography, and field observations. Xcel Energy will generally use a 100-foot ROW for each corridor, a portion of which would be constructed within Xcel Energy's existing 100-foot ROW where parallel. Where the single and double circuit transmission corridors are parallel, 25 feet of the ROW will be shared, minimizing the ROW width to 175 feet total (instead of 200-foot width). As discussed in Section 1.6.5, Xcel Energy has made assumptions on existing ROW widths to determine corridor sharing. Appendix C details corridor sharing assumptions for each configuration. For a general 100-foot ROW that shares corridor with roads, Xcel Energy assumes up to 45 feet of shared ROW (road overhang) and 55 feet of new ROW (on private property) when poles are centered 5 feet onto private property. For a general 100-foot ROW that shares corridor with railroads, Xcel Energy assumes up to 100 feet of shared ROW (on railroad property) when poles are centered 50 feet onto railroad property. This assumes poles for the existing 34.5 kV line are up to 50 feet inside the assumed 200-foot wide railroad ROW. This only applies to Routes A, B, C, and D (not Route E).

Summary of General Route Impacts

All five route options are between approximately 45 and 50 miles long and would require relocation of approximately 32 miles of Line W3316 and 27 miles of Line W3351. As indicated above in Section 5.4.1, the routes generally share 25 feet of ROW when two transmission corridors are parallel and assume up to 45 feet of ROW sharing with road ROW.

Table 5.4-1 below provides a summary of the general route impacts for the construction of Routes A through E. The portions of the Project which only include removal of existing structures (i.e., the W3606 removal portion of Routes A through E, W3316 Removal, and W3351 Removal) are separated in Table 5.4-1 as they do not involve any new installation.

Table 5.4-1 Summary of General Route Impacts by Route

Route ID	Total ROW (New + Shared)		Shared ROW				New ROW		Total % of Shared ROW
	Total Length (ft)	Total ROW Area (acres)	Shared ROW Length (ft)	Existing ROW Width (ft)	Shared ROW Width (ft)	Shared ROW Area (acres)	New ROW Width (ft)	New ROW Area (acre)	
New Installation									
Route A	322,780	1,118	246,984	100	100	572	Varies [1]	546	51
Route B	441,778	1,164	360,063	100	Varies[1]	630	Varies [1]	534	54
Route C	302,770	1,072	239,615	100	100	554	Varies [1]	518	52
Route D	328,687	1,115	231,392	100	100	534	Varies [1]	581	48
Route E	282,361	1,088	212,516	100	Varies [1]	410	Varies [1]	678	38
Existing Line Removal									
W3606 Removal – Routes A - E [2]	8,655	17	8,655	100	100	17	N/A	N/A	100
W3606 Removal with Distribution – Routes A - C [3]	9,355	21	9,355	100	100	21	N/A	N/A	100
W3606 Removal with Distribution – Routes D and E [4]	11,258	26	11,258	100	100	26	N/A	N/A	100
W3316 Removal	167,896	385	167,896	100	100	385	N/A	N/A	100
W3351 Removal	140,831	324	140,831	100	100	324	N/A	N/A	100

[1] See Appendix B Table 1.
[2] Routes A, B, C, D, and E are identical for their W3606 removal portion.
[3] Routes A, B, and C are identical for their W3606 removal with distribution portion.
[4] Routes D and E are identical for their W3606 removal with distribution portion.

5.4.2 Land Cover/Land Use

Land Cover generally refers to the current type of features, either natural or human-made, on the land. Land Use refers to how humans use the land. Land cover/use types by route segment are included in Appendix B, Table 2.

Methods

Land cover types were derived from the USGS GAP Land Cover database (USGS, 2011). The GAP Ecosystem Land Use attribute was reviewed and assigned to a category consistent with the PSC Table 2. Table 5.4-2 below displays the GAP Ecosystem Land Use categories and how they were

translated to the PSC categories. After the reclassification, the land cover data was spot checked for accuracy.

For each route, a corridor corresponding to the required ROW width was established along the route centerline. Existing ROW corridors were then overlaid on the route corridor to distinguish land cover in existing ROW versus new ROW. The polygons of each land cover type were then clipped with the route and existing ROW corridors. The acreages of each resulting polygon were quantified with GIS software. The resulting acreages were summed by land type within existing and new ROW for each segment.

Table 5.4-2 Land Cover/Land Use Classification

USGS GAP Ecosystem Land Use Type	PSC Land Cover Type	PSC Land Use Category
Cultivated Cropland	Crop Land	Agricultural
Managed Tree Plantation	Specialty	
Pasture/Hay [1]	Grassland	Undeveloped Lands
Harvest Forest – Grass/Forb Regeneration		
North-Central Interior Sand and Gravel Tallgrass Prairie		
Laurentian-Acadian Floodplain Systems	Non-Forested Wetland [2]	
Open Water (fresh)		
Great Lakes Coastal Marsh Systems		
Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen	Forested Wetland [2]	
Eastern Boreal Floodplain		
Laurentian-Acadian Swamp Systems		
Boreal Aspen-Birch Forest	Upland Forest	
Boreal Jack Pine-Black Spruce Forest		
Boreal White Spruce-Fir-Hardwood Forest		
Laurentian-Acadian Northern Hardwoods Forest		
Laurentian Pine-Oak Barrens		
Laurentian-Arcadian Pine-Hemlock-Hardwood Forest		
North-Central Interior Beech-Maple Forest		
North-Central Interior Oak Savanna		

Table 5.4-2 Land Cover/Land Use Classification		
USGS GAP Ecosystem Land Use Type	**PSC Land Cover Type**	**PSC Land Use Category**
Developed, Open Space	Developed	Developed/Urban
Developed, Low Intensity		
Developed, Medium Intensity		
Developed, High Intensity		
Quarries, Mines, Gravel Pits and Oil Wells		

[1] Pasture/hay lands have not been field-verified to assess previous disturbance. For the purposes of the analysis in this application, Xcel Energy is categorizing pasture/hay as grassland.

[2] Forested and non-forested wetlands described here are based on the GAP land use types. A more detailed discussion of wetlands based on field survey, Wisconsin Wetlands Inventory, and soils data is presented in Sections 6.3 and 8.0.

Summary of Land Cover

Appendix B, Table 2 provides an estimate of the land cover that will be impacted by each route option within the proposed ROW. A map of land cover in the Project area is also included in Appendix A, Figure 6. The land cover present in the area includes agricultural lands, undeveloped lands, and developed/urban lands as described in more detail below. Table 5.4-3 below provides a summary of the land cover for the construction of Routes A through E. The portions of the Project which only include removal of existing structures (i.e., data regarding the W3606, W3316, and W3351 Removals are separated as they do not involve any new installation.

Table 5.4-3 Summary of Land Cover Impacts by Route

Route ID	Agricultural				Undeveloped Lands								Developed / Urban	
	Crop Land		Specialty		Grassland		Non-Forested Wetland		Forested Wetland		Upland Forest		ROW Area (acres)	
	ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)			
	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New
New Installation														
Route A [1]	0	26	0	1	386	38	31	10	0	16	0	367	158	95
Route B [1]	0	12	0	0	380	7	30	9	0	11	0	200	151	375
Route C [1]	0	18	0	1	381	32	30	8	0	13	0	355	151	93
Route D [1]	0	31	0	1	368	40	29	10	0	16	0	368	141	119
Route E [1]	0	40	0	1	271	58	25	10	0	17	0	469	116	91
Laydown Yards	0	10	0	0	0	33	0	9	0	2	0	17	0	18
Existing Line Removal														
W3606 Removal – Routes A through E [2]	0	N/A	0	N/A	14	N/A	3	N/A	0	N/A	0	N/A	0	N/A
W3606 Removal with Distribution – Routes A through C [3]	0	N/A	0	N/A	13	N/A	7	N/A	0	N/A	0	N/A	0	N/A
W3606 Removal with Distribution – Routes D and E [4]	0	N/A	0	N/A	14	N/A	8	N/A	0	N/A	0	N/A	0	N/A
W3316 Removal	0	N/A	0	N/A	319	N/A	50	N/A	0	N/A	0	N/A	16	N/A
W3351 Removal	0	N/A	0	N/A	268	N/A	35	N/A	0	N/A	0	N/A	21	N/A

Table 5.4-3 Summary of Land Cover Impacts by Route

Route ID	Agricultural				Undeveloped Lands								Developed / Urban	
	Crop Land		Specialty		Grassland		Non-Forested Wetland		Forested Wetland		Upland Forest		ROW Area (acres)	
	ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)		ROW Area (acres)			
	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New	Shared	New

[1] Includes the routes off-ROW access roads.

[2] Routes A, B, C, D and E are identical for their W3606 removal portion.

[3] Routes A, B, and C are identical for their W3606 removal with distribution portion.

[4] Routes D and E are identical for their W3606 removal with distribution portion.

5.4.2.1 Agricultural Land Use

Agricultural land cover includes active fields, pastures, recently fallow fields (old field) and specialty crops (i.e., tree farms). Fields or other areas with no evidence of recent tillage or agricultural production were not included as agricultural land. A detailed discussion of agricultural lands in included in Section 6.1.

Crop Land

Cropland is present within new ROW for all 5 relocation routes. The smallest amount of cropland (12 acres) is present within Route B and the largest amount of cropland (40 acres) is present within Route E.

There is no cropland present within the W3606, W3316, or W3351 Removals.

Specialty

Specialty agricultural land is present within new ROW for all relocation routes except Route B. There is no specialty agricultural land present within the W3606, W3316, or W3351 Removals.

5.4.2.2 Undeveloped Land Use

The types of undeveloped lands include grassland, non-forested wetland, forested wetland, and upland forest.

Grassland

As mentioned above, because areas identified as hay/pasture in the USGS GAP data were not field verified as previously disturbed, these lands are conservatively classified as grassland. To a lesser extent, grasslands are also characterized as harvest forest – grass/forb regeneration and recently burned grassland.

Grassland is present within all 5 relocation routes, the majority within shared ROW. The smallest amount of grassland (357 acres) is present within Route E and the largest amount of cropland (451 acres) is present within Route A.

Grassland is present within the W3606, W3316, and W3351 Removals.

Non-Forested Wetland

This section refers to non-forested wetland types encountered along the routes (i.e., Laurentian-Acadian Floodplain Systems, open water (fresh), and Great Lakes coastal marsh systems; Table 5.4-1). Forested wetlands are discussed in the next section. As mentioned in Table 5.4-1, these wetland types are based on GAP land cover data. A detailed discussion of wetlands based on

survey data and wetland specific desktop resources (i.e., Wisconsin Wetland Inventory (WWI)) along the routes is provided in Sections 6.3 and 8.0.

Non-forested wetland is present within all 5 relocation routes, the majority within shared ROW. The smallest amount of non-forested wetland (46 acres) is present within Route E and the largest amount of non-forested wetland (51 acres) is present within Route A.

Non-forested wetland is present within the W3606, W3316, and W3351 Removals.

Forested Wetland

As previously discussed, a detailed discussion of wetland types along both routes, including forested wetlands and the criteria used to identify forested wetland areas, is included in Sections 6.3 and 8.0. The forested wetland category does not include wetlands located in existing transmission line ROW which are no longer forested due to previous clearing. These wetlands are included within the non-forested wetland category. Based on the GAP land cover classifications, forested wetlands include Laurentian-Acadian Swamp Systems, Boreal-Laurentian Conifer Acidic Swamp and Treed Poor Fen, and Eastern Boreal Floodplain.

Forested wetland is present within new ROW for all 5 relocation routes. The smallest amount of forested wetland (11 acres) is present within Route B and the largest amount of forested wetland (16 acres) is present within Route A and Route E.

There is no forested wetland present within the W3606 or W3316 Removals, but is present within the W3351 Removal.

Upland Forest

A detailed discussion of forested lands along the routes, including the criteria to identify forested areas, is included in Section 6.1. The upland forest category does not include cleared areas in existing transmission line ROW through previously wooded areas. These areas are included within the grassland category. Based on the GAP land cover data, the following ecosystem land use types comprise upland forest: boreal aspen-birch forest, Laurentian-Acadian northern hardwoods forest, Laurentian pine-oak barrens, boreal white spruce-fir hardwood forest, Laurentian-Arcadian Pine-Hemlock-Hardwood Forest, North-Central Interior Beech-Maple Forest, North-Central Interior Oak Savanna, and boreal jack pine-black spruce forest (Table 5.4-1).

Upland forest is present within new ROW for all five route options. The smallest amount of upland forest (200 acres) is present within Route B and the largest amount of upland forest (469 acres) is present within Route E.

Upland forest is not present within the W3606 Removal, but is present within both the W3316 and W3351 Removals.

5.4.2.3 Developed / Urban Land

Developed lands are based on the GAP land use developed types classifications (Table 5.4-1). These are primarily related to roads along the routes.

Developed land is present within all five route options, the majority within shared ROW. The smallest amount of developed land (211 acres) is present within Route E and the largest amount of developed land (526 acres) is present within Route B.

Developed land is present within the W3606, W3316, and W3351 Removals.

5.4.3 Federal, State, Local, and Tribal Lands

Federal, state, local, and tribal lands are listed in Appendix B, Table 3 and shown on Figure 4 in Appendix A.

Methods

Federal, state, local, and tribal lands were identified from a number of sources including public lands data from Ashland County (Iron County did not have a dataset available), BIA, WDNR managed areas, and the USGS Protected Area Database. Xcel Energy then assigned generic ownership and management fields to the database (i.e., federal, state, local, and tribal). Ownership with WDNR data were then cross-referenced, and data discrepancies were identified, reviewed, and corrected to reflect data that matched the appropriate jurisdiction.

The acreages of these managed lands intersecting the Project ROW was determined by intersecting the parcel data with the routes. However, as requested by the Commission, a representative length is also provided for each entry in Appendix B, Table 3. The length refers to the maximum length of a parcel within the proposed ROW. In some cases, the parcel data created instances where the route width included only a portion of a parcel. The route widths in Appendix B, Table 3 represent the entire route width needed for that segment. The ROW acreages are based on GIS calculations and account for these instances where the parcel edges do not align with the route width. Where the crossing length is zero, the public lands parcel is within the Project ROW, but not overlapping the proposed centerline.

Summary of Federal, State, Local, and Tribal Lands

An estimate of the potential impacts to public lands is compiled by crossing length and management type for each route and is included in Appendix B, Table 3.

Each route option crosses generally the same areas of state, county, and local lands; however, as shown in Table 3 of Appendix B, the majority of the government land crossings are associated with the removal of lines W3316 and W3351 in the Bad River Reservation and the removal of line W3606 within Copper Falls State Park (approximately 1.8 miles). Of the approximately 54 acres

ROW on public land that Routes A, B, and C would require, only about 17 acres would be new ROW. Route D would also require approximately 54 acres of ROW on public land, but about 20 acres would be new ROW. Finally, Route E would require approximately 57 acres of ROW on public lands, 20 acres of which would be new ROW.

5.4.4 Schools, Hospitals and Daycare Centers

Distances to schools, daycare centers, and hospitals are addressed in Appendix B, Table 4. There are no schools, daycare centers or hospitals within 300 feet of the five proposed route options.

Methods

The number of schools, daycare centers and hospitals and the distance of these buildings from the route centerlines were determined using GIS measurements to geocoded addresses provided by the following state agencies:

- Locations of licensed family and group child care centers were provided by the Wisconsin Department of Children and Families (Wisconsin Department of Children and Families, 2018);
- Public and private school locations were provided by the Wisconsin Department of Public Instruction (Wisconsin Department of Public Instruction, 2018); and
- Hospital locations were provided by the Wisconsin Department of Health Services (Wisconsin Department of Health Services, 2018).

Summary of Schools Hospitals and Daycare Centers

There are no schools, daycare centers, or hospitals within 300 feet of the five route options. The nearest daycare center is approximately 800 feet north of all route options within the city of Hurley. The nearest school is approximately 1,100 feet south of all route options within the City of Hurley; however, there is also a school located 800 feet south of Laydown Yard #6 within the City of Mellen. The nearest hospital is approximately 2 miles west of W3351 Removal and 2.5 miles northwest of all the route options within the City of Ashland.

5.4.5 Residential Buildings

Residential buildings include homes and apartments. Residential buildings within 300 feet of the centerline of each route option are quantified in Appendix B, Table 5 and are shown in Appendix A, Figure 4.

Methods

The types of residential buildings (homes and apartments) and the distance of these buildings from the route centerlines were determined using GIS measurements on aerial photography. Residential buildings were tallied according to five distance categories from the route centerlines:

0–25 feet, 26–50 feet, 51–100 feet, 101–150 feet, and 151–300 feet. Where residences were within 300 feet of multiple route segments, the residence was classified with the closest segment.

Summary of Residential Buildings

Table 5.4-4 below provides a summary of the residential buildings near the construction of Routes A through E. The portions of the Project which only include removal of existing structures (i.e., the W3606, W3316, and W3351 Removals) are separated as they do not involve any new installation.

Table 5.4-4 Summary of Distances of Residential Buildings[1] from ROW Centerline by Route

Route ID	0-25 feet	26-50 feet	51-100 feet	101-150 feet	151-300 feet	Total
New Installation						
Route A	1	4	23	26	89	143
Route B	4	8	23	33	109	177
Route C	1	5	16	13	69	104
Route D	1	7	23	27	73	131
Route E	1	5	18	24	60	108
Existing Line Removal						
W3606 Removal – Routes A through E [2]	0	0	0	0	0	0
W3606 Removal with Distribution – Routes A through C [3]	0	0	1	0	1	2
W3606 Removal with Distribution – Routes D and E [4]	0	0	1	0	2	3
W3316 Removal	0	0	0	3	4	7
W3351 Removal	0	0	0	0	3	3

[1] Includes the number of homes and apartment buildings. The number of units in each apartment building can be found in Appendix B Table 5. All structures are outside of the existing and proposed new ROWs.
[2] Routes A, B, C, D, and E are identical for their W3606 removal portion.
[3] Routes A, B, and C are identical for their W3606 removal with distribution portion.
[4] Routes D and E are identical for their W3606 removal with distribution portion.

5.4.6 Route Impact Summaries

A summary of the impacts associated with each route option is provided in Appendix B, Table 7. This includes key items that were included in the separate impact tables listed and described in sections 5.4.1 – 5.4.5 above.

5.5 Construction Impacts

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the National Electric Safety Code (NESC), North American Electric Reliability Corporation, and Xcel Energy standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

5.5.1 Proposed construction sequence

The following proposed construction sequence is planned to assist with system operations to help with voltage support when serving intermediate loads in the Mellen area (see Figure 5.5-1 and Appendix A, Figure 9). Each phase of construction begins at the East Mellen Substation. Line outages would occur between substations to allow construction to install the new lines while the existing lines are de-energized.

Phase 1A: East Mellen Substation and DPC Morse Substation
Phase 1B: DPC Morse Substation and Upson Substation
Phase 1C: Upson Substation and DPC Iron Belt Substation
Phase 1D: DPC Iron Belt Substation and Hurley Substation
Phase 1E: Hurley Substation and Project's eastern end point at Ironwood Substation
Phase 2A: East Mellen Substation and DPC Highbridge Substation
Phase 2B: DPC Highbridge Substation and Minersville Substation
Phase 2C: Minersville Substation and Project's western end point at Structure W3316-42

Figure 5.5-1 Proposed Construction Sequence

To avoid having to install temporary bypass lines causing additional temporary fill and wetland impacts, Xcel Energy intends to use one of two options to remove and reinstall Xcel Energy's overhead distribution lines:

Option 1: Offset construction of new transmission line centerline between 5 and 10 feet where existing distribution is located and then transfer over distribution onto the new transmission line and then remove the old distribution line. In areas where two new transmission circuits would be built parallel to each other, then energize this circuit at distribution voltage, transfer distribution customers onto the newly energized transmission circuit, de-energize the old distribution and then remove it, build the new line in old alignment, energize the new distribution circuit, cut over distribution customers onto the new distribution line, de-energize the transmission circuit that was at distribution voltage.

Option 2: Tip/Lean existing distribution poles, set new transmission pole, install 14 to 16 foot long distribution arms, install 5 foot long hot arms onto the long distribution arms to spread the old distribution wires further to allow for safe transmission wire stringing over the top of the energized old distribution wires. String in transmission and distribution wires. Energize new distribution, cut over customers and then remove old distribution wires.

The Project involves the following general activities for constructing overhead transmission lines:

- Soil borings – Collection of geotechnical data will be necessary for final design of the transmission line. Soil borings are typically completed using rubber tired or tracked drill rigs, depending on site and access conditions. A pick-up truck or all-terrain vehicle (ATV) is also typically used to transport the crew and drilling supplies to the work area.
- Surveying and staking of ROW and structures – These activities are minimal impact, typically completed by a two-person crew travelling by foot, ATV, or pick-up truck.
- Tree Clearing– Vegetation crews will clear new or expanded ROW, and where necessary, access routes. Vegetation will be cut at or slightly above the ground surface using mechanized mowers, harvesters or by hand. Root stocks will generally be left in place, except in areas where stump removal is necessary to facilitate the movement of construction vehicles, or as required by the landowner.
- Access Road Construction – In some locations such as areas of steep topography or where off-ROW access is required, it may be necessary to create access roads prior to line construction. This includes activities such as tree clearing, grading, and putting down gravel. This work is typically completed using equipment such as a bulldozer, track-hoe, skid-loader, and dump trucks.
- Installation of Construction Matting – Matting will be installed along access roads and the ROW to provide access through wetlands or other unstable soil areas prior to transmission line construction. Construction matting may consist of timber, composite, or hybrid

timber mats and will be installed with rubber-tired mat trucks, forwarders, forklifts, or skid loaders.

- Installation of erosion control Best Management Practices (BMPs) – BMPs will be installed prior to all anticipated ground disturbance and in compliance with the DNR stormwater permit.
- Foundation installation and/or excavation for direct embedded structures – The routes include a combination of direct-embedded poles without culverts, direct-embedded poles with culverts and rebar-reinforced drilled pier foundations.
- Structure setting for direct-embedded poles without culverts (no concrete foundation and no culvert), a hole is excavated to the appropriate depth. The base of the structure is placed into the excavated hole, and the area around the pole is backfilled with clean granular fill. For direct-embedded poles in culverts a hole is excavated, a culvert is placed vertically into the hole (typically 48-inch diameter) and the pole is then inserted in the middle of the culvert to the appropriate depth, then backfilled.

  For structures requiring a reinforced concrete foundation, the required hole is excavated and a rebar cage and anchor bolts are placed into the excavation. The excavation is then filled with concrete to a point where the rebar cage and anchor bolts are covered leaving a typical 1-foot reveal of the foundation above grade with exposed threaded anchor bolts. The complete caisson is allowed to cure.

  Typical equipment for this phase of construction includes: dump trucks, drill rigs, cranes, vacuum trucks, concrete trucks, concrete pump trucks and tanker trucks.

- Structure setting – (for drilled pier foundations) after the direct embed base is set or the caisson is cured, the steel pole structure is mounted to the base. Typical equipment for this phase of construction are cranes and bucket trucks.
- Wire stringing and clipping – once all the structures within a wire-pull segment are set, dollies are attached to the cross-arms and ropes are pulled through each of the dollies. Crews will need to access all the structures in that wire-pull segment to get the rope from structure to structure. These ropes are then used to pull the conductor wires in. Crews will access each of the structures, install the insulators and clip the conductor wire into each, and remove the dollies. This requires access to each structure with either a bucket truck or helicopter. Wire set up areas containing reel trailers, wire pullers, and related equipment are located at each end of the wire pull.
- Cleanup and Restoration of ROW – Upon completion of construction, cleanup and site restoration occurs. This includes removing construction mats, temporary clear span bridges (TCSBs), and other material or debris from the ROW, any necessary seedbed preparation, and seeding. Typical equipment for these activities includes mat trucks, bobcats, pickup trucks, and other light duty vehicles.

- Existing Line Removals – To reduce environmental impacts, helicopter removal in conjunction with ground removal of the structures are being evaluated. Xcel Energy is anticipating use of helicopters to remove structures along the W3606 Removal (Structures 441 to 495 inside Copper Falls State Park) as well as for the entirety of the W3351 and W3316 removals. Hooper Corporation, a contractor to Xcel Energy, prepared a plan describing the removal methodology which is provided as Appendix L of this Application.

5.5.2 Construction Impacts

5.5.2.1 Size of Excavations

Transmission poles will be installed within one of three foundation types: drilled concrete pier, direct-embedded within culverts and direct-embedded without culverts. A majority of the tangent structures for the proposed routes are expected to use the direct-embed type installation, either with or without culverts. Some structures with heavier loading such as at angles, corners or long spans will be installed with drilled pier/poured concrete foundations.

Volumes of excavations for the different installation/foundation type are approximately as follows (see Tables 5.5-1 and 5.5-2):

Table 5.5-1 Volume of Excavation by Installation or Foundation Type

Foundation/Installation Type	Approx. Diameter (ft)	Approx. Depth (ft)	Approx. Volume of excavation (yd^3)
Concrete Pier	7	36	51.3
Direct-embed	4	12	5.6

Table 5.5-2 Number of Each Installation/Foundation type by Route

Foundation/ Installation Type	Route A	Route B	Route C	Route D	Route E
Concrete Pier	183	150	161	182	180
Direct-embed: Culverts	482	483	469	473	471
Direct-embed: no culvert	481	483	469	473	470
Total	**1146**	**1116**	**1099**	**1128**	**1121**

5.5.2.2 Type of Construction Machinery Used

Section 5.5.1 describes the typical construction equipment anticipated to be used on the Project.

5.5.2.3 Construction Disturbance Zone

Transmission line construction will be confined to the ROW, identified off ROW access routes, substation sites, and the laydown and staging areas. Most disturbances will occur in the area immediately surrounding transmission line structures. In areas where access cannot be gained from existing roads, some disturbance from vehicular traffic is expected to occur. Disturbance at these areas may include clearing of vegetative cover, soil compaction, vehicular tracking, and some topsoil disturbance.

5.5.2.4 Spoil Management

Excavated soil may be thinly spread on surrounding upland areas and stabilized depending on site conditions, landowner preferences, and environmental requirements. Temporary stockpiles of excavated soils and woody debris will be required throughout the course of construction. Those materials will either be hauled to an approved disposal site or remain onsite in an upland location upon landowner consent. While specific locations have not been determined, it is anticipated that minor soil piles may be required adjacent to excavations for the new transmission line structures and within the laydown yards. Stockpiles will be placed in upland locations. Stockpiled materials will be prevented from entering any wetlands or waterways by the use of proper erosion control methods such as silt fence, silt socks, or wattles.

If contaminated materials are encountered during construction, spoils will be isolated and steps will be taken to determine disposal requirements in accordance with applicable regulations.

5.5.3 Unique construction methods

As discussed in Section 5.5.1, Xcel Energy is evaluating use of helicopters to remove structures along the W3606, W3351, and W3316 transmission lines. It is anticipated that a deep bedrock layer exists between Mellen and Hurley and may require dynamite blasting to prepare holes for pole structures rather than using a typical auguring method to excavate the holes.

5.6 Staging Areas

Temporary staging areas (laydown yards/laydown areas) outside of the Project ROW will be utilized to store job trailers, construction vehicles and equipment, transmission line structures, conductor, cables and equipment, and other related material/equipment.

Potential laydown yards have been identified based on the construction requirements of the Project, proximity to work areas, and environmental and landowner impacts. Laydown yards are selected based on the ability to minimize the amount of disturbance and preparation required to provide suitable surfaces for temporary storage and staging of construction equipment and material. For example, sites that are paved and/or have been previously graded and cleared of vegetation, such as parking lots, old gravel pits, and fields are ideal locations for laydown yards.

Xcel Energy has identified 11 potential laydown yards along the Project. These sites are preliminary and the Applicant has not yet discussed use of these areas with the landowners as of the filing of this Application. The Applicant prefers the laydown yards to be 10 to 15 miles apart along the Project.

An environmental review of the potential laydown yards was conducted using existing GIS data and aerial photography. The following resources were utilized in the evaluation: WDNR Natural Heritage Inventory (NHI), WDNR Hydro Layer, WDNR WWI, Wisconsin Historical Society (WHS) database, and county soil maps. The potential laydown yards are listed in Table 5.6-1 below, and are shown on site maps included in Appendix A, Figure 7.

Table 5.6-1 Potential Laydown Yards

Site #	Parcel Owner	Township, Range, Section	County	Size of Laydown Yard (acres)
1	Robert & Shelton Brevak	T47N R4W Sec. 27	Ashland	6.7
2	M Jolma Inc	T46N R4W Sec. 35	Ashland	9.8
3	Ashland County Highway Department	T45N R3W Sec. 16	Ashland	5.5
4	Bayfield Electric Cooperative, Midland Services Inc	T45N R3W Sec. 13	Ashland	8.9
5	Terrence L Peters	T45N R2W Sec. 30	Ashland	10.0
6	Former CN railroad storage yard	T44N R2W Sec. 6	Ashland	1.9
7	Jake Peters Trucking LLC, Tyler J Harding	T44N R2W Sec. 6	Ashland	3.4
8	1. Northern States Power Company. 2. City of Mellen. 3. Midwest Hardwood Corporation. 4. North Country Lumber Company	T44N R2W Sec. 5	Ashland	1.9
9	Iron County	T45N R1W Sec. 29	Iron	5.8
10	Brian Peterson	T45N R1W Sec. 18	Iron	32.9
11	Ross Peterson	T46N R2W Sec. 26	Iron	3.6

If any additional laydown yards or other staging areas are identified they will be reviewed and evaluated for potential impacts or concerns with respect to wetlands, waterways, natural features, grading and clearing requirements, threatened and endangered resources, and cultural or archaeological concerns. Xcel Energy will also notify the Commission of these new locations and will submit the necessary information to the Commission prior to establishing any such areas in accordance with Wis. Admin. Code § PSC 111.71.

5.7 Off-ROW Access Roads

Wherever possible, Xcel Energy intends to access the Project by traveling down the Project ROW or directly from public roads that intersect the Project ROW. Access from outside the Project ROW will be required in some cases where physical limitations exist within the Project ROW,

where other constraints prevent direct access from public roads, or to avoid impacts to environmentally sensitive areas within the Project ROW.

Routes A, B, C, D, and E have reasonable access from local, County and State Highways and therefore, off-ROW access will be minimal. However, depending on the route selected, there may be some areas that will require off-ROW access. Refer to Appendix A, Figure 4 for location of off-ROW access roads identified during field reviews. Upon route selection, the preliminary access plan may be amended based on additional field review, negotiations with local landowners and/or contractor requirements.

Following construction, the access roads may be left in place or returned to prior conditions, depending on landowner preference.

5.7.1 Identify those areas along the proposed routes where off-ROW access roads may be required.

The off-ROW access paths are shown on Figure 4 in Appendix A. Whenever possible these off-ROW access paths follow existing access routes, forest roads, or trails. For helicopter removal activities, off-ROW access is not anticipated.

5.7.2 For each route, provide the total length of off-ROW access roads.

Each proposed Route option would utilize off-ROW access roads. The total length of off-ROW access roads for each route is provided in Appendix B, Table 2.

5.7.3 Discuss the reasons for the necessity for off-ROW access roads such as topography, rivers/wetlands, etc. If protection of a natural resource is a reason, discuss how the resource would be protected during construction and operation of the proposed project.

The need for potential off-ROW access paths has been identified based on field reviews of the routes as well as aerial photography and topography data. Off-ROW access roads are necessary in location where the Routes do not parallel existing roads, and where the terrain prevents travel along the ROW. The purpose of developing these off-ROW access paths is to allow for safe material and equipment movement to and from the Project ROW.

The primary constraints necessitating off-ROW access roads are steep terrain and/or waterway and wetland crossings (e.g., Bad River and West Fork Montreal River). Access from outside the ROW in these areas is required due to the impracticable amount of grading and road building and bridge construction that would be necessary within the ROW.

Upon approval of a route, the access paths may be amended based on additional field review and negotiations with local landowners.

5.7.4 Provide quantitative land cover information for off-ROW access roads similar to the information provided in PSC Impact Tables.

A list of preliminary off-ROW access paths is provided in Appendix B, Table 2. This table provides quantitative land cover information for areas such as agriculture, grassland, forested areas, and forested and non-forested wetlands. The land cover information was quantified using GIS, as described in Section 5.4.

The impacts included in this table were calculated utilizing an access path with an approximate width of 14 feet, based on typical construction practices. In forested lands, existing cleared roads or trails were utilized where possible, however, in most cases these areas were relatively narrow, and the entire width was identified as forested land cover within the GIS data. As such, the forested land impacts, as outlined in Appendix B, Table 2, may overstate the actual tree clearing necessary for utilizing these paths. As discussed, these paths may be amended once a route is ordered and further analysis is conducted.

5.7.5 If the off-ROW access roads would be modified post-construction, provide details.

Prior to construction, many of the off-ROW access paths will need modifications and improvements to allow for safe equipment movement to and from the Project ROW. These modifications may include vegetation removal, grading, and/or gravel placement; however, permanent wetland fill associated with off-ROW access paths is not proposed. Access within wetlands may include the use of ice roads, conducting work during dry or frozen conditions, low ground pressure equipment, or construction mats. These methods are further described in Section 6.3.

Once construction has been completed, off-ROW access paths created or modified for the Project would typically be restored to pre-construction conditions. Appropriate restoration materials and methods would be employed, as described in Section 6.9. Depending on landowner negotiations and requirements, the improved access paths may be left in place. Some of the off-ROW access paths may be required for long-term maintenance and safe operation of the transmission line. Once a route has been ordered, the need for permanent access routes will be evaluated.

6.0 NATURAL RESOURCE IMPACTS

6.1 Forested Lands

6.1.1 Upland Woodlands Description

Xcel Energy reviewed the USGS GAP national land cover data to identify forested lands along each proposed route (USGS, 2011). PSC Table 2, provided in Appendix B, presents the total acres of forested lands along each of the proposed route segments. The GAP national land cover data does not provide specific details about tree species, size, or use of forested areas; therefore, this information is not available for all forested areas crossed by the proposed routes. GAP national land cover data does not accurately depict existing cleared utility or road rights-of-way as they are often shown as forested if adjacent woodlands exist. Therefore, Xcel Energy adjusted the dataset to ensure forested lands were accurately represented by categorizing the existing cleared ROW as grassland or non-forested wetland (if applicable).

Based on this adjusted upland forest dataset:

- Route A would cross approximately 362 acres;
- Route B would cross approximately 196 acres;
- Route C would cross approximately 351 acres;
- Route D would cross approximately 365 acres; and
- Route E would cross approximately 464 acres.

6.1.2 Managed Forest Law (MFL) and Forest Crop Law (FCL)

6.1.2.1 Identify properties within proposed ROWs that are enrolled in the MFL or FCL programs

Tables 6.1-1 and 6.1-2 list the properties identified along the routes that are enrolled in the Managed Forest Law (MFL) program, based on a November 12, 2020 data request to WDNR (see Appendix F). In some cases, only a portion of a parcel may be enrolled in the MFL program. MFL properties occur between Ashland and Minersville, Highbridge and Mellen, and Mellen and Gile for the proposed route options and along the two northern removal segments. There are no MFL properties between Minersville and Highbridge, or between Gile and Ironwood. Due to similar spatial proximity of the five routes, most cross the same MFL properties; however, there are some MFL properties that are only crossed by Route B or Routes A, C, D, and E.

No properties enrolled in the FCL program are crossed by the proposed route options. The MFL program was enacted in 1985 and replaced the Forest Crop Law program.

Table 6.1-1 MFL Properties Crossed by the Ashland-Ironwood Transmission Line Relocation Project – Route Options

City Segment/Tax ID	Route A (acres)	Route B (acres)	Route C (acres)	Route D (acres)	Route E (acres)
Ashland to Minersville					
02-007-1998	2.1	0.6	2.1	2.1	3.5
02-015-1993	2.3	0.0	2.3	2.3	3.9
02-019-1993	2.0	2.0	2.0	2.0	4.9
02-020-1991	7.1	6.2	7.1	7.1	7.1
02-020-1993	7.8	4.1	7.8	7.8	10.0
02-021-1993	4.1	-	4.1	4.1	7.6
02-022-1993	2.2	<0.1	2.2	2.2	3.9
02-023-1993	2.3	-	2.3	2.3	3.9
02-258-1999	-	2.4	-	-	-
02-316-1999	-	2.5	-	-	-
02-321-1999	-	2.5	-	-	-
Subtotal	*30.0*	*20.3*	*30.0*	*30.0*	*44.8*
Minersville to Highbridge					
None	-	-	-	-	-
Highbridge to Mellen					
02-001-1999	5.2	-	3.0	3.0	5.2
02-015-2017	4.9	3.2	3.2	2.6	4.9
02-041-2004	9.2	-	5.2	5.2	9.2
Subtotal	*19.3*	*3.2*	*11.5*	*10.8*	*19.3*
Mellen to Gile					
02-036-2004	7.5	6.2	7.8	6.7	6.7
02-070-2005	2.8	7.3	2.8	2.8	2.8
02-223-1999	2.5	3.5	4.7	0.0	0.0
02-244-1999	14.7	17.3	8.9	19.1	19.1
26-003-2014	5.6	5.6	5.6	5.6	5.6
26-005-1999	4.2	6.0	4.2	4.2	4.2
26-005-2006	-	0.3	-	-	-
26-010-2019	8.0	8.0	8.0	8.0	8.0
26-011-2006	5.7	2.6	4.9	2.6	4.9
26-011-2016	2.3	1.8	2.3	2.3	2.3
26-012-2010	3.3	2.6	3.3	3.3	3.3
26-012-2013	1.2	6.1	1.2	2.4	1.2
26-013-2015	3.8	3.8	3.8	3.8	3.8
26-013-2018	2.1	7.8	2.1	2.1	2.1
26-014-2012	3.5	3.5	3.5	3.5	3.5
26-018-2002	4.4	3.6	4.4	3.6	4.4
26-018-2020	13.5	13.5	13.5	13.5	13.5

Table 6.1-1 MFL Properties Crossed by the Ashland-Ironwood Transmission Line Relocation Project – Route Options

City Segment/Tax ID	Route A (acres)	Route B (acres)	Route C (acres)	Route D (acres)	Route E (acres)
26-020-2016	4.8	2.8	4.8	4.8	4.8
26-020-2017+	9.6	5.2	9.6	9.6	9.6
26-021-2017	3.0	2.9	3.0	3.0	3.0
26-025-2013	3.1	2.6	3.1	3.1	3.1
26-207-1998	5.1	4.8	5.1	5.1	5.1
26-223-1999	3.6	0.7	3.6	3.6	3.6
26-226-1999	3.4	5.5	3.4	3.4	3.4
26-228-1999	81.3	73.1	81.3	81.3	81.3
Subtotal	*199.1*	*197.3*	*194.9*	*197.6*	*199.4*
Gile to Ironwood					
None	-	-	-	-	-
Grand Total	**248.3**	**220.8**	**236.4**	**238.4**	**263.5**

Table 6.1-2 MFL Properties Crossed by the Ashland-Ironwood Transmission Line Relocation Project – W3606, W3316, and W3351 Removals

Tax ID	W3316 Removal (acres)	W3351 Removal (acres)
02-003-1993	1.3	-
02-022-1979	-	0.3
02-232-1999	29.2	12.3
02-251-1999	2.2	-
02-272-1999	-	10.0
02-279-1999	1.7	-
02-283-1999	11.4	15.3
02-286-1999	-	3.1
26-002-1997	3.0	-
26-002-2006	-	0.7
26-003-2016	-	2.1
26-003-2019	6.1	-
26-003-2020	1.9	-
26-004-2012	4.3	-
26-005-2004	-	2.8
26-006-2014	3.3	-
26-008-1991	3.0	-
26-009-2006	3.2	-
26-010-2002	3.0	-
26-011-2002	0.2	-
26-012-2014	1.4	-

Table 6.1-2 MFL Properties Crossed by the Ashland-Ironwood Transmission Line Relocation Project – W3606, W3316, and W3351 Removals		
Tax ID	**W3316 Removal (acres)**	**W3351 Removal (acres)**
26-013-2001	5.1	-
26-017-2012	3.0	-
26-017-2013	-	5.1
26-036-2007	2.8	-
26-048-2007	2.9	-
26-231-1999	2.7	-
26-258-1999	3.0	-
Total	**94.8**	**51.8**

6.1.2.2 Discuss how the proposed project would affect the properties enrolled in the MFL or FCL programs.

The extent to which program participation may be affected cannot be determined based on the information available to Xcel Energy. The extent to which a property is enrolled in the MFL program will be identified during the easement negotiation process. If any landowner would be unable to continue participation, Xcel Energy will compensate the landowner for the costs of withdrawal and any adverse tax consequences.

6.1.3 Provide specific details for mitigating or minimizing construction impacts in and around woodlands.

This Project will require the clearing of tall vegetation within the ROW and clearing of brush and trees along temporary construction access. Tall-growing vegetation that may interfere with safe construction and safe and reliable operation of the transmission line will be removed and controlled. Specifically, woody vegetation will be removed as needed within the ROW for construction of the Project and managed through the operational life of the facility. Clearing of vegetation within the ROW will occur prior to construction activities as allowed by landowner agreements and permit conditions.

The cut and scatter method may be used during construction in areas where limited clearing will occur. The purpose of this method is to limit the need for unnecessarily hauling and potentially disturbing the existing ground or vegetation. Likely situations where this method will be used are in shrub and brush areas with a limited number of trees. Limited numbers of trees in shrub wetlands may be disposed of in this manner as long as trees that are cut and scattered originate within the wetland.

Woody vegetation may be chipped and scattered over the ROW in non-agricultural upland areas. Invasive shrubs such as common and glossy buckthorn with berries will not be chipped and scattered to minimize the spread of these species. Chipping will not occur in wetlands or

floodplains, with the exception of chipped material that is evenly scattered through the use of rubber-tracked blade mowers or ASV Posi-Track mower type equipment used to clear small diameter trees and shrubs. Chipped material left in wetland will not exceed a depth of 2 inches to ensure wetland vegetation can be re-established and wetland hydrology is not altered. Chipped material derived from onsite locations may be spread as mulch up to six inches deep in upland areas to provide ground protection along access paths. Upon abandonment of access routes, mulch will be spread evenly to a depth no greater than 2 inches.

As discussed in Section 6.6 (Invasive Species) tree clearing timing restrictions and slash management procedures can be implemented to prevent the spread of oak wilt, emerald ash borer and gypsy moth in forested areas. All vegetation clearing will be completed in accordance with the Commission restrictions on oak tree cutting and pruning as specified in Wis. Admin. Code § PSC 113.0511.

6.2 Grasslands

6.2.1 For each route segment describe the grasslands that would be impacted by the proposed project. Include the following information in the description.

Grasslands were classified based on USGS GAP ecosystem land use types pasture/hay and harvest forest – grass/forb regeneration. As previously mentioned in Section 5.4.2, because areas identified as pasture/hay were not field verified as previously disturbed, these lands are conservatively classified as grassland. Further, as discussed above, the shared portion of Xcel's existing easement was categorized as grassland to more accurately represent project impacts.

Based on this adjusted grassland dataset:

- Route A would cross approximately 451 acres;
- Route B would cross approximately 414 acres;
- Route C would cross approximately 440 acres;
- Route D would cross approximately 436 acres; and
- Route E would cross approximately 357 acres.

6.2.2 Provide specific details for mitigating or minimizing construction impacts in and around grasslands.

Grasslands crossed by the Routes are predominantly within existing or shared ROW. Additionally, because most grassland is made of up pasture/hay land there is inherently some level of disturbance from either livestock or machinery. Regardless, Xcel Energy will limit construction impacts to the off-ROW access roads and the transmission line ROW.

6.3 Wetlands (see also Section 8.0)

Xcel Energy utilized multiple methods to evaluate the presence of wetlands along the routes. Portions of the Project area were field investigated in May and June 2019, as documented in the Wetland Determination Report, dated December 2020, and provided as Appendix K. For the portion of the Project area where field surveys did not occur, the wetlands were identified using a conservative desktop method. This conservative desktop method assumes all areas mapped as WWI and/or hydric soils are wetland for the purpose of quantifying impacts in this Application. Desktop wetland estimates may not be representative of the actual number and acreage of wetlands present, and thus may be overestimated. Following the PSC decision , if the project is approved and a route determined, Xcel Energy will consult with the applicable agencies (i.e., WDNR, U.S. Army Corps of Engineers (USACE) to determine if additional field survey is required pre-construction for areas where field survey was not completed. A summary of all wetlands which may be impacted by each route is presented in Appendix B, Table 8 and shown in Appendix A, Figure 5. In addition, access through several wetlands will be required for off-ROW access. These are discussed in Section 5.7; however, they are also briefly addressed in this section.

6.3.1 Wetland Crossings

The total number of wetlands that intersect the proposed relocation routes, as well as the removal segments, are summarized in Table 6.3-1. These numbers are derived from the detailed inventory of wetlands presented in Appendix B Table 9. Although each wetland feature ID was counted, any given wetland feature may be present in multiple areas, depending on its shape. The proposed wetland impacts are discussed in Section 8.0.

Table 6.3-1 Number of Wetlands Present within each Project Component

Route	Non-Forested	Forested	Type Unknown [1]	Total
New Installation				
Route A [2]	417	355	23	795
Route B [2]	389	294	141	824
Route C [2]	421	354	63	838
Route D [2]	392	322	84	798
Route E [2]	376	364	94	834
Laydown Yards	5	1	9	15
Existing Line Removal				
W3606 Removal – Routes A through E [3]	26	4	5	35
W3606 Removal with Distribution – Routes A through C [4]	18	3	0	21

Table 6.3-1 Number of Wetlands Present within each Project Component

Route	Non-Forested	Forested	Type Unknown [1]	Total
W3606 Removal with Distribution – Routes D and E [5]	22	5	0	27
W3316 Removal	51	104	50	205
W3351 Removal	40	54	53	147

[1] Potential wetlands mapped via hydric soils desktop mapping layers.
[2] Includes off-ROW access roads for each route.
[3] Routes A, B, C, D, and E are identical for their W3606 removal portion.
[4] Routes A, B, and C are identical for their W3606 removal with distribution portion.
[5] Routes D and E are identical for their W3606 removal with distribution portion.

6.3.2 For each route segment provide the number of structures that would be constructed within wetlands/identify the structure or facility that would be constructed within wetlands.

Appendix B, Table 8 depicts conceptual pole locations which have been developed to evaluate the potential impacts on wetlands. These pole locations are approximated based on the proposed design spans for the structures that will be used and have been spotted along the alignment to conservatively estimate transmission line impacts. The wetland impacts will be closely reviewed during detailed Project design to help minimize impacts without adding undue costs or physical impacts to the integrity and reliability. The wetland impact estimates associated with pole locations may require adjustment during detailed design to accommodate landowner concerns, or if previously unknown or unanticipated conditions are encountered. Examples of these conditions include physical terrain details that may affect span lengths or refinement of wetland boundaries once easements are obtained and field delineations are completed.

Based on preliminary engineering, Route A will have up to 472 pole structures installed within a wetland, Route B will have up to 492, Route C will have up to 428, Route D will have up to 440, and Route E will have up to 456. There are no new permanent impacts anticipated along the line removal areas. The permanent wetland impact at each pole location will be less than 0.001-acre, based on a typical 20 square foot area of impact associated with each installation (see Section 5.5.1). Further detail on each wetland, including the area of wetland impact and wetland type, is provided in Appendix B, Table 8.

Temporary wetland impact proposed for the Project is further discussed in Section 8.0.

6.3.3 Provide the methods to be used for avoiding, minimizing or, if necessary, mitigating construction impacts in and near wetlands.

Xcel Energy will avoid or minimize wetland impacts during its routing and siting process and with the use of certain construction techniques (see Section 8.2). However, there are some areas

where impacts on wetlands cannot be avoided along the route segments. Equipment access and pole installation within wetlands will be required during transmission line construction. The use of heavy equipment in some wetlands or portions of wetlands may be avoided if unstable soil conditions exist and alternate access is practical. If a wetland has drier, more stable and cohesive soils, or is frozen and rutting will not occur, construction will likely proceed in a manner similar to upland construction.

If saturated or unstable soil conditions exist, several construction techniques may be implemented to reduce the effects on wetland soil structure and dependent functions, including hydrology and the wetland's capacity for re-vegetation of native species. Disturbance to wetlands will be minimized using one or more of the following standard construction techniques depending on soil conditions:

- completing wetland construction during dry or frozen conditions;
- the use of equipment with low ground pressure tires or tracks;
- placement of construction matting to help minimize soil and vegetation disturbances and distribute axle loads over a larger surface area, thereby reducing the bearing pressure on wetland soils; and/or
- the use of ice roads.

Site conditions at the time of construction will dictate the type of construction access technique. Wetland access routes will not require permanent fill.

Clearing of shrub wetlands and conversion of forested wetlands is proposed for the Project. Wetland impacts from clearing activities and associated clearing will be minimized as discussed in Section 6.1.3.

A general discussion of vegetation typically found in wetlands in the Project area is provided in Section 8. If it is evident that transmission line construction activities could spread invasive plant species to new areas, appropriate protection measures will be implemented. These measures, detailed in Section 6.6, may include: avoiding known infested areas, removal, or control of small populations of plants, scheduling construction activities during the plant's dormant period, or cleaning of equipment prior to accessing uninfested areas.

A Construction Sediment and Erosion Control Plan will be prepared prior to construction when additional site-specific information is available. BMPs will be implemented near wetlands during construction to minimize the potential for erosion.

Upon completion of construction of the Project, Xcel Energy will conduct site restoration and revegetation consistent with the activities described in Section 6.9. Xcel Energy will work with the appropriate agencies to determine compensatory mitigation requirements.

6.3.4 For "Significant" or "High Quality" Wetlands in the project area identify:

6.3.4.1 The Location where the proposed Project would cross or potentially Impact

Wetlands along each relocation and removal route option were evaluated for Areas of Special Natural Resource Interest (ASNRI), in accordance with Wis. Admin. Code. § NR 1.05. Wetlands are considered ASNRI when they fall within (entirely or in part), or are contiguous with, one or more of the designated special features listed in NR 1.05 (e.g., trout streams, state wildlife areas or parks). However, despite their association with these special features, not all ASNRI-designated wetlands are significant or of high quality; many are affected by historical and/or ongoing land use practices (e.g., development) that have caused degraded conditions such as altered hydrology or infestation with invasive plant species.

Xcel Energy evaluated the presence of ASNRI-designated wetlands along the routes using the WDNR Surface Water Data Viewer. No ASNRI-designated wetlands are crossed by proposed relocation routes; however, there are several ASNRI wetlands along the W3351 removal that are associated with the Kakagon Sloughs, and the Bad and White River systems.

6.3.4.2 The Wetland Type

The majority of wetlands along each relocation and removal route options are wet meadows and forested wetlands, most of which are characterized by low plant diversity due to domination by invasive species due the adjacency of road rights-of-way; however, higher-quality wetlands may exist along each route. Other significant wetlands may also be present that present uncommon characteristics such as relatively intact native plant communities, structural diversity (e.g., mix of cover types), and/or hydrological attributes/functions (e.g., riparian, open water). Wetland quality information is provided in Appendix B, Table 9.

6.3.4.3 The specific mitigation methods that would be used to mitigate potential impacts

The process that was conducted in which to avoid and minimize impacts on wetlands is discussed in Section 8.2, which included minimizing the number of wetland crossings to the extent practicable and the number of structures spotted within wetlands. Since the routes are mainly collocated with either Xcel Energy's existing easement or road rights-of-way, fragmentation of greenfield wetland areas is minimized. Refer to Sections 6.3.3 and 8.2 for additional information on mitigation methods for minimizing impacts on wetlands.

6.4 Waterbodies/Waterways (see also Section 8.0)

The WDNR maintains the 24K Hydro layer, which was reviewed to assess the presence of waterbodies and waterways along the routes (hereafter collectively referred to as waterways). Xcel Energy also evaluated the presence of waterways along portions of the routes by conducting field surveys. A summary of all waterways which may be crossed by each route segment is presented in Appendix B, Table 8 and shown in Appendix A, Figure 5.

6.4.1 Waterway Crossings

The total number of waterways that are located within the Project area are summarized in Table 6.4-1. As previously noted, Xcel Energy will conduct additional field surveys after PSC Order issuance, if the project is approved, and if determined necessary by applicable agencies. All waterways intersecting the proposed route corridors are included in this table. These numbers are derived from the detailed inventory of waterways presented in Appendix B Table 9. Note that this data reflects each time a waterway intersects the Project area, including meandering waterways that flow in and out of the Project area, creating multiple intersections of a single waterway with the Project area. Therefore, a single waterway may be counted several times if it meanders within the Project area. The proposed regulated waterway impacts are discussed in Section 8.0.

Table 6.4-1 Number of Waterways Present within the Project Components

Route ID	Perennial	Intermittent
New Installation		
Route A	106	54
Route B	100	57
Route C	103	51
Route D	100	55
Route E	87	37
Laydown Yards	0	1
Existing Line Removal		
W3606 Removal – Routes A through E [1]	2	0
W3606 Removal with Distribution – Routes A through C [2]	3	0
W3606 Removal with Distribution – Routes D and E [3]	4	1
W3316 Removal	17	27
W3351 Removal	10	13

[1] Routes A, B, C, D, and E are identical for their W3606 removal portion
[2] Routes A, B, and C are identical for their W3606 removal with distribution portion
[3] Routes D and E are identical for their W3606 removal with distribution portion

6.4.2 Structures Constructed Below the Ordinary High Water Mark (OHWM)

Xcel Energy is not proposing to place transmission line structures below the OHWM of waterways along any of the proposed route options.

6.4.3 Need and Method of Constructing Waterway Crossings

A summary of the waterways proposed to be crossed along the proposed routes and line removals, and their proposed methods for access across, are presented in Appendix B, Table 8. All proposed crossings are necessary to allow for safe and efficient construction access along each route. In addition, several waterways are proposed to be crossed as part of off-ROW access requirements (see Section 5.7), which may also require a TCSB.

Where necessary and authorized by the WDNR, TCSBs will be placed to avoid in-stream disturbance. Each TCSB will consist of construction mats or other similar material, placed above the OHWM on either side to span the stream bank. Preparation for setting the bridge may include minor blading and excavation confined to the minimum area necessary for safe bridge installation. Removal of low-growing trees, shrubs, and other shoreline vegetation will be minimized to the extent practicable. Proper erosion control measures will be installed and maintained during and after the utilization of the temporary crossing. For those streams or rivers where stream crossing permits have not been requested and acquired, rope will typically be thrown across to the opposite bank then picked up and threaded into dollies. More detail on rope pulling and wire stringing is provided in Section 5.5. Additional details regarding waterway crossings are provided in Section 8.0.

6.4.4 Avoiding / Minimizing Construction Impacts in or Near Waterways

The number of potential temporary stream crossings has been minimized by proposing to access from the ROW on either side of the stream or by using existing public crossings to the extent practicable. Xcel Energy will work with private landowners to identify alternate access routes to further reduce the use of stream crossings, if possible. Some of these crossings may not be required if Xcel Energy is able to secure alternate access via privately-owned land. However, Xcel Energy will apply for WDNR permits for all potential crossings that are reasonably anticipated in the event that avoidance is not possible.

As discussed in Section 6.4.3, the amount of disturbance associated with installation of the TCSBs will be minimized to reduce potential impact on the waterways. Refer to Section 6.6 for a description of mitigation methods that will be employed to avoid the spread of invasive plants and Section 6.9 for a discussion of re-vegetation and restoration plans for disturbed areas, including those near waterways. In addition, an erosion control and storm water management plan will be prepared prior to construction.

A Construction Sediment and Erosion Control Plan will be prepared once a route is ordered and additional site-specific information is available. BMPs will be implemented near waterways during construction to minimize the potential for erosion.

One WDNR mapped waterway is located within Laydown Yard #10. Xcel Energy is requesting WDNR perform a navigability determination on this, and other, WDNR mapped waterways, as noted in Appendix B, Table 8. If this waterway is determined navigable by the WDNR, the

Laydown Yard boundary will be modified as necessary to exclude the waterway to avoid impacting the waterway.

6.4.5 Special Waterways

Waterways along several routes that are designated as ASNRI are identified in Appendix B, Table 8. The WDNR's Surface Water Data Viewer[7] was used to identify these special waterways in the Project area. Refer to Section 6.4.4 for Xcel Energy's proposed measures to avoid, reduce, and mitigate impacts associated with all waterway crossings. Additionally, the following methods will be based on site-specific information once a route is ordered and field surveys are conducted, to mitigate potential impacts to ASNRI waterways in the Project area.

Potential direct and indirect impacts on these special waterways have been minimized during preliminary pole spotting as structures are not immediately adjacent to the majority of these designated waterways. During final design of an ordered route and to the extent feasible, Xcel Energy will attempt to maintain a suitable distance from the structure to the waterway. In addition, at this point, it is anticipated that numerous ASNRI-designated waters will require a TCSB crossing; however, as discussed above, attempts will be made to find alternate access that does not require a bridge crossing once a route is ordered.

6.4.5.1 Outstanding or Exceptional Resource Waters

Table 6.4-2 includes the number of ORW and ERW waterways that are intersected by each route option. Note that this data reflects each time a waterway intersects the Project area, including meandering waterways that flow in and out of the Project area, creating multiple intersections of a single waterway with the Project area. Therefore, a single waterway may be counted several times if it meanders within the Project area. The proposed regulated waterway impacts are discussed in Section 8.0.

Table 6.4-2 Outstanding Resource Waters Present within the Project Components [1]

Route ID	Outstanding Resource Water (ORW)	Exceptional Resource Water (ERW)
New Installation		
Route A [2]	9	10
Route B [2]	9	10
Route C [2]	8	9
Route D [2]	17	19
Route E [2]	0	0
Laydown Yards	0	0
Existing Line Removal		

[7] https://dnr.wi.gov/topic/surfacewater/swdv/

Table 6.4-2 Outstanding Resource Waters Present within the Project Components [1]

Route ID	Outstanding Resource Water (ORW)	Exceptional Resource Water (ERW)
W3606 Removal – Routes A through E [3]	0	2
W3606 Removal with Distribution – Routes A through C [4]	0	0
W3606 Removal with Distribution – Routes D and E [5]	0	1
W3351 Removal	1	3
W3316 Removal	0	1

[1] Wisconsin Department of Natural Resources, Surface Water Data Viewer, 2021.
[2] Includes off-ROW access roads for each route.
[3] Routes A, B, C, D, and E are identical for their W3606 removal portion
[4] Routes A, B, and C are identical for their W3606 removal with distribution portion
[5] Routes D and E are identical for their W3606 removal with distribution portion

6.4.5.2 Trout Streams

Table 6.4-3 includes the number of designated trout streams and its designated Class at the crossing location that are intersected by each route option. Note that this data reflects each time a waterway intersects the Project area, including meandering waterways that flow in and out of the Project area, creating multiple intersections of a single waterway with the Project area. Therefore, a single waterway may be counted several times if it meanders within the Project area. The proposed regulated waterway impacts are discussed in Section 8.0.

Table 6.4-3 Trout Streams Present within the Project Components [1]

Route ID	Trout Streams
New Installation	
Route A [2]	27
Route B [2]	29
Route C [2]	14
Route D [2]	16
Route E [2]	12
Laydown Yards	0
Existing Line Removal	
W3606 Removal – Routes A through E [3]	2
W3606 Removal with Distribution – Routes A through C [4]	3
W3606 Removal with Distribution – Routes D and E [5]	4
W3351 Removal	5

Table 6.4-3 Trout Streams Present within the Project Components [1]	
Route ID	**Trout Streams**
W3316 Removal	9

[1] Wisconsin Department of Natural Resources, Surface Water Data Viewer, 2021.
[2] Includes off-ROW access roads for each route.
[3] Routes A, B, C, D, and E are identical for their W3606 removal portion.
[4] Routes A, B, and C are identical for their W3606 removal with distribution portion.
[5] Routes D and E are identical for their W3606 removal with distribution portion.

6.4.5.3 Wild and Scenic Rivers

There are no Wild and Scenic Rivers crossed by any proposed or removal section of the Project.

6.5 Rare Species and Natural Communities (see also Section 9.0)

6.5.1 Communication with WDNR and USFWS

The Project was reviewed for potential impacts to state listed rare species and natural communities using the WDNR's NHI data. Certified Endangered Resources (ER) Reviews were submitted to and approved by the WDNR. A total of three ER Reviews were completed for the Project, specifically:

- ER Review log # 18-315: This ER Review covers Routes A, B, C, D, and E, the off-ROW access roads associated with these routes, and the 11 laydown yards located within Wisconsin. It was originally submitted to the WDNR in 2018 and was renewed and re-approved by the WDNR on March 25, 2021.
- ER Review log # 21-275: This ER Review covers the W3316 Removal portion of this Project. It was approved by the WDNR on April 27, 2021.
- ER Review log # 21-276: This ER Review covers the W3351 Removal portion of this Project. It was approved by the WDNR on April 27, 2021.

The ER Reviews summarize all state-listed rare species, natural communities, and other natural features with element occurrence records within one mile of the Project routes for terrestrial and wetland occurrences and within 2 miles for aquatic occurrences.

Rare species and natural communities that are not legally protected or are exempt from protection by the Project include special concern animal species; threatened and endangered, and special concern plant species; and natural communities.

A review of federally listed species with potential to occur in the Project area was conducted using the USFWS Information for Planning and Consultation online review tool. The results of the review identified the following federally listed species as known or expected to occur in the Project area: Canada lynx (*Lynx canadensis*), northern long-eared bat (*Myotis septentrionalis*),

red knot (*Calidris canutus rufa*), and piping plover (*Charadrius melodus*). No designated critical habitat is present within the Project Area. A Project notification letter was submitted to the USFWS on January 11, 2021 (see Appendix F). In addition, Xcel Energy will adhere to the National Bald Eagle Management Guidelines to avoid disturbance to breeding eagles in the Project area.

6.5.2 Compliance with WDNR and USFWS Direction

As stated above, ER Reviews have been approved by the WDNR. Due to confidentiality requirements for Wisconsin NHI data, redacted copies of the ER Reviews are included in Appendix H. Appropriate follow-up actions will be coordinated with WDNR and USFWS. Xcel Energy will continue regular communication with the agencies throughout the application process to follow state and federal endangered resources laws during Project evaluation, planning, and implementation.

6.5.3 Concerns and Potential Impacts to Rare Species

Several of the rare species and natural communities have multiple element occurrence records along the route segments. In addition to providing an inventory of rare species and communities, the ER Reviews also outlines the required follow-up actions necessary to be implemented during Project construction to protect threatened and endangered animal species, as well as the recommended follow-up actions to help conserve rare species, communities, or other natural features that are not legally protected or are exempt from protection by the Project (i.e., special concern animal species; threatened, endangered, and special concern plant species and natural communities).

Avoidance measures are required for one federal listed bird (Bald Eagle), one state and federal listed mammal (Northern Long-Eared Bat), and one state-listed reptile (Wood Turtle) in areas of suitable habitat.

Several rare plants have been recorded in the Project vicinity and may be impacted by the Project. Although not required because utility projects are exempt from take of rare plants, the WDNR recommends avoidance or minimization of take of rare plants.

In addition, various special concern species and natural communities have also been recorded in the vicinity of the Project. As noted above in Section 6.5.1, special concern species and natural communities are not legally protected; however, the WDNR recommends avoidance or minimization measures for these species and communities.

6.5.3.1 Endangered Species Law Impacts on Project

The ER Reviews (Appendix H) summarize the element occurrence records which exist for animal species requiring follow up actions. The required actions will be implemented (by species) where threatened and endangered animals are verified to occur based on species surveys or where species are assumed to occur based on the presence of suitable habitat along the proposed

routes. The required follow-up actions, as well as the effects these actions have on the proposed Project, vary by animal group and are summarized in the ER Reviews (Appendix H). In general, the required actions include compliance with the final USFWS 4(d) rule for the Northern Long-Eared Bat, Migratory Bird Treaty Act, Bald and Golden Eagle Act, and the WDNR's Broad Incidental Take Permit for the Wood Turtle.

If during the course of the Project there is uncertainty regarding actions to avoid impacts or take for some species or in some situations, Xcel Energy will coordinate with the WDNR's Natural Heritage Conservation Program (NHCP) on appropriate conservation measures. If the Project cannot completely avoid all areas of suitable habitat or take, Xcel Energy will work with the WDNR's NHCP Incidental Take Coordinator to apply for an Incidental Take Permit/Authorization for the affected species.

6.5.3.2 Voluntary Conservation Actions

Rare species and natural communities that are not legally protected or are exempt from protection by the Project include special concern animal species; threatened and endangered, and special concern plant species; and natural communities. The ER Reviews (Appendix H) summarize the specific segments along which element occurrence records exist for each species, community, or feature. In consultation with the WDNR NHCP, Xcel Energy may implement recommended avoidance and impact minimization measures by species, community, or feature where they are verified to occur.

Avoidance and minimization measures recommended as follow-up actions to help conserve rare species and natural communities are similar to those outlined in Section 6.5.3.1. Recommended measures to protect special concern animal species when and where practicable include: voluntary species surveys, adherence to avoidance periods, and use of erosion/runoff prevention practices. Similarly, measures recommended for conserving rare plants include voluntary species surveys and implementation of minimization or avoidance areas where present. Recommendations that may be implemented for natural communities include avoiding direct impacts and/or minimizing impacts, where possible; and implementing erosion control practices and invasive species BMPs.

6.6 Invasive Species (Uplands and Wetlands)

6.6.1 Location of Invasive Species/Disease-Causing Organisms

The Project survey corridor will be evaluated for invasive plant species during field investigations, to be completed after a final route is approved but prior to construction.

The entire state of Wisconsin is under quarantine to help prevent the spread of emerald ash borer and gypsy moths. Practices that minimize the spread include avoiding movement of wood products (logs, posts, pulpwood, bark and bark products, slash and chipped wood from tree clearing) and hardwood firewood from quarantine areas to non-quarantine areas, as per Wis.

Admin. Code ATCP §21.17. Where wood products cannot be left on-site, alternative plans will be developed to meet the requirements.

6.6.2 Mitigation Methods

Xcel Energy will comply with Wis. Admin. Code ch. NR 40 by implementing BMPs when encountering species listed as "Restricted" or "Prohibited". Standard BMPs have been developed to avoid and minimize the spread of NR 40 listed species. These BMPs will vary throughout the ROW based on the degree of invasiveness, severity of the current infestation, and susceptibility of non-infested areas to invasion.

Typical BMPs include:

- avoidance through construction timing and alternate access;
- proper management of construction vehicles and materials (i.e., storage, cleaning);
- minimizing ground disturbance;
- placing a barrier between construction vehicles and plants (i.e., construction matting);
- proper storage and disposal of plant materials;
- promoting native regeneration; and
- leaving cut vegetation on site where it is cut (i.e., mowing shrubs).

Additional evaluation will be conducted on the ordered route to further identify invasive species, their locations, and locations where site specific BMPs are appropriate. Appropriate BMPs will be incorporated into compliance plans and implemented during construction.

6.7 Archeological and Historic Resources

Cultural resources were identified within a one-mile buffer around the proposed corridors referred to as the study area. GIS data was obtained from the WHS and additional information pertaining to cultural resources was accessed online through the Wisconsin Historical Preservation Database. Historical documents and aerials were reviewed to evaluate the potential for previously unidentified archeological resources within the proposed corridors.

6.7.1 Wisconsin Historical Society Sites

Merjent, Inc. (Merjent) on behalf of Xcel Energy, completed a Phase Ia Literature Review of cultural resources within the areas of the proposed routes. The objective of this review was to identify historic properties that may be potentially affected by the proposed Project and to provide recommendations for mitigation or avoidance of these resources. The Phase Ia Literature Review defined the area of potential effect as a 400-foot-wide corridor (200 feet on

either side of the centerlines). A summary of historic properties by route option is described below and a full account provided in the Phase Ia report.

There are 16 previously reported archaeological sites, nine cemetery/burials, and 247 architectural/historic resources within one mile of Route A. While none of the archaeological sites and 87 of the architectural/historic resources have been assessed for listing on the NRHP, three architectural/historic resources have been determined not eligible for the NRHP. Two architectural/historic resources have been determined potentially eligible for listing, while a total of 155 structures are NRHP-Listed. Of these, 152 structures are contributing resources to the Montreal Company Location Historic District in the City of Montreal. The nine cemetery/burial sites are protected under Wisconsin Statute §157.70(4). Three archaeological sites and five historic structures are within the Route A 400-foot-wide corridor.

There are 15 previously reported archaeological sites, nine cemetery/burials, and 247 architectural/historic resources within one mile of Route B. While none of the archaeological sites and 88 of the architectural/historic resources have not been assessed for listing on the NRHP, two architectural/historic resources have been determined not eligible for the NRHP. Two architectural/historic resources have been determined potentially eligible for listing, while a total of 155 structures are NRHP-Listed. Of these, 152 structures are contributing resources to the Montreal Company Location Historic District in the City of Montreal. The nine cemetery/burial sites are protected under Wisconsin Statute §157.70(4). Five archaeological sites and five historic structures are within the Route B 400-foot-wide corridor.

There are 16 previously reported archaeological sites, nine cemetery/burials, and 244 architectural/historic resources within one mile of Route C. While none of the archaeological sites and 85 of the architectural/historic resources have not been assessed for listing on the NRHP, two architectural/historic resources have been determined not eligible for the NRHP. Two architectural/historic resources have been determined potential eligible for listing, while a total of 155 structures are NRHP-Listed. Of these, 152 structures are contributing resources to the Montreal Company Location Historic District in the City of Montreal. The nine cemetery/burial sites are protected under Wisconsin Statute §157.70(4). Three archaeological sites and four historic structures are within the Route C 400-foot-wide corridor.

There are 16 previously reported archaeological sites, nine cemetery/burials, and 246 architectural/historic resources within one mile of Route D. While none of the archaeological sites and 87 of the architectural/historic resources have not been assessed for listing on the NRHP, two architectural/historic resources have been determined not eligible for the NRHP. Two architectural/historic resources have been determined potential eligible for listing, while a total of 155 structures are NRHP-Listed. Of these, 152 structures are contributing resources to the Montreal Company Location Historic District in the City of Montreal. The nine cemetery/burial sites are protected under Wisconsin Statute §157.70(4). Five archaeological sites and five historic structures are within the Route D 400-foot-wide corridor.

There are 16 previously reported archaeological sites, eight cemetery/burials, and 228 architectural/historic resources within one mile of Route E. While none of the archaeological sites and 87 of the architectural/historic resources have not been assessed for listing on the NRHP, two architectural/historic resources have been determined not eligible for the NRHP. Two architectural/historic resources have been determined potential eligible for listing, while a total of 155 structures are NRHP-Listed. Of these, 152 structures are contributing resources to the Montreal Company Location Historic District in the City of Montreal. The eight cemetery/burial sites are protected under Wisconsin Statute §157.70(4). Four archaeological sites and two historic structures are within the Route E 400-foot-wide corridor.

There is one previously reported archaeological site, one cemetery/burial, and nine architectural/historic resources within one mile of the 115 kV W3316 Removal; none have been assessed for listing on the NRHP.

There are three previously reported archaeological sites, one cemetery/burial, and 14 architectural/historic resources within one mile of the 88 kV W3351 Removal; none has been assessed for listing on the NRHP. The two cemetery/burial sites are protected under Wisconsin Statute §157.70(4). No previously recorded sites or structures are within the 400-foot-wide corridor for the W3351 Removal.

There are two previously reported archaeological sites, one cemetery/burial, and 14 architectural/historic resources within one mile of 34.5 kV W3606 Removal. Only one architectural/historic resource has been listed on the NRHP; all remaining resources have not been assessed for listing on the NRHP. The cemetery/burial is protected under Wisconsin Statute §157.70(4). One archaeological site is within the W3606 Removal 400-foot-wide corridor.

A total of 11 laydown yards have been identified to support the removals and construction of new transmission lines. The laydown yards would be shared space regardless of the route option selected. Of these, the majority are located along the western half of the Project between Ashland and Upson, while Laydown Area 11 is located near Hurley. While there are a number of archeological sites and historic structures with the one-mile-wide study area around each, no recorded cultural resource is located within the 400-foot-wide corridor.

The access roads include public and private roads that are off ROW, as well as large sections of ROW where travel would utilize the proposed and/or existing easement. Impacts to recorded cultural resources would therefore be similar regardless of which route option is selected.

6.7.2 Archaeologist Reports and Official Correspondence

Kari Krause, M.S., R.P.A., of Merjent completed a Phase Ia Literature Review in accordance with WHS standards (Dudzik, et. al. 2012). This report contains confidential information and is provided to the PSC Historic Preservation Officer under separate cover.

6.7.3 Historic Resource Mitigation Measures

Upon PSC final route selection and line design, further archaeological and historic resource review and investigation may be undertaken if necessary, to ensure that all identified sites found within the ROW or along access routes are protected.

6.8 Conservation Easements

Geographic information regarding properties with conservation easements or encumbrances was acquired from the sources listed in Table 6.8-1.

Table 6.8-1 Sources Used to Identify Conservation Easements Along Each Route

Property Type	Database Source
Publicly available information for federal, state, and local conservation easements	National Conservation Easement Database
Wetland Reserve Program and Grassland Reserve Program Easements	Natural Resources Conservation Service (NRCS)
Emergency Watershed Protection Program - Floodplain Easement	NRCS
Riparian Easements	USFWS
State Fishery Areas, State Parks, Forests and Trails	WDNR - Managed Lands
Land & Water Conservation Fund Properties	WDNR, Bureau of Community Financial Assistance
The Nature Conservancy Easements	U.S. Geological Survey Gap Analysis Program - Stewardship

6.8.1 Conservation Easement Summary

Conservation land interests, among many other factors, were utilized in the routing and siting process to inform the selection of proposed routes while avoiding, to the extent practicable, properties with recorded conservation land interests. There are many types of conservation easements and encumbrances that exist today. Some of the conservation easements are placed upon properties by state and federal agencies (e.g., scenic easements), while other conservation land interests are initiated by the landowner (e.g., Conservation Reserve Program or Farmland Preservation Plan [FPP]). These land rights are generally not known until the Project's easement acquisition process is initiated with the landowner of record. Once Xcel Energy is made aware of the existence of other land rights on the property, it will work with the landowner to accommodate the existing agreement or make them whole if there are additional monetary burdens they have to incur. A discussion of parks and recreation areas, and any land use restrictions associated with these features, is provided in Section 7.7. A discussion of MFL and FCL properties is provided in Section 6.1.2; FPP is discussed in Section 7.4.3.

A review of publicly available information identified State Conservation Land, managed by Iron County, that would be crossed by all five route options; and the Route E crossing of a DNR-owned

and managed parcel south of Copper Falls State Park. The W3351 and W3316 Removals would be removed from State Conservation Land parcels. In addition, off-ROW access for all five route options and use of Laydown Yard 9 during construction would cross State Conservation Land managed by Iron County.

Based on publicly available information and preliminary communications with landowners Xcel Energy is not aware of any additional properties with existing conservation easements or other types of agreements that restrict land use that would be crossed by the proposed routes or removal lines.

6.9 Restoration of Disturbed Areas

The need for and approach to site restoration and re-vegetation will be based on the degree of disturbance caused by construction activities and the ecological setting of each site, and will need to reflect and satisfy the requirements of the property owner. If construction can be accomplished without creating appreciable soil disturbance, restoration may not require active re-vegetation efforts if the Project areas would restore naturally. Restoration activities will be implemented following the completion of construction activities. These activities will begin as soon as practical and as allowed by seasonal conditions.

6.9.1 Proposed Revegetation

Xcel Energy will develop a site-specific restoration plan for disturbed sites based on the level of ground disturbance post-PSC Order The plan will be included in a stormwater application to the DNR. In some cases, re-growth of vegetation in disturbed areas may be allowed to occur without supplemental seeding. In cases where there is no sign of re growth of pre-existing vegetation species in the first month of the subsequent growing season, an assessment will be made and if necessary, an appropriate seed mix will be brought in and properly applied. The restoration and re-vegetation methods for wetland areas are described in Section 6.2.3.

6.9.2 Vegetative Monitoring Criteria and Methods

During active construction and ROW restoration, Xcel Energy trained environmental inspectors, contractors or an environmental independent monitor will inspect re-vegetation and restoration activities in accordance with Wis. Admin. Code ch. NR 216 and the Wisconsin Pollution Discharge Elimination System general permit conditions.

Written documentation of the inspection will be maintained by Xcel Energy describing the re-vegetation progress and corrective measures taken, if applicable. Areas where ground disturbance occurs will be monitored until 70% re-vegetation has occurred.

6.9.3 Invasive Species Monitoring and Management

The invasive species located along the Project corridor and the BMPs to avoid the spread of invasive species are discussed in Section 6.6. A post-construction assessment of these areas will be conducted in the growing season following construction. If this monitoring shows that the species composition within the ROW varies from surrounding conditions, Xcel Energy will discuss the need for additional monitoring with applicable agencies.

7.0 COMMUNITY IMPACTS

7.1 Communication with Potentially Affected Public

As detailed below, communication efforts regarding the Ashland-Ironwood Transmission Relocation Project began in 2019.

Xcel Energy's representatives have actively sought input on the Project route and related issues from state, county, and local governments, elected officials, landowners, and business leaders. Copies of letters, emails, and comments forms that are referenced below are included in Appendix J. Following is a timeline and list of communication and outreach efforts beginning in Summer 2019:

- Summer 2019. Project team members attended meetings with the Bad River Band, Ashland County Board of Supervisors, Iron County Board Members, and the Mayor of Mellen to provide an overview briefing on the project and answer questions.
- August 27, 2019 Xcel Energy presented a project overview to the Iron County Board of Supervisors at the Iron County Courthouse with some members of the public in attendance
- May 10, 2019. Xcel Energy met with WDNR staff at Copper Falls State Park and WDNR Office of Energy (via telephone conference) to discuss access, easements and rebuild options.
- September 20, 2019. Xcel Energy sent mailers out to approximately 3,500 landowners and local official in the project area highlighting an upcoming public open house for the Project which was scheduled for October 2-3 (see Oct 2-3, 2019 bullet for more detail). Project website was created to provide details about the proposed Project, including an interactive map, comment form, structure photos and fact sheets.
- September 23-25, 2019. Newspaper ads were placed in the Ashland Daily Press (Sept 25), the Mellen Weekly Record (Sept 25) and the Ironwood Daily Globe (Sept 23) announcing that Xcel Energy will be hosting three public open houses on October 2-3 for the Ashland-Ironwood Transmission Relocation Project.
- October 2 and 3, 2019. 1st round of public open houses held. Three open houses were held in Hurley, Mellen and in Ashland. The open houses served as an opportunity for residents to learn more about the project, view potential route maps, ask questions and provide feedback. Comment forms were made available at the open houses and on the web site with comments accepted through October 31, 2019. Xcel Energy received approximately 50 comments from the open houses and based on the comments, Xcel Energy eliminated route options along and leading to Highway 2 and refined route segment options along Highways 13 and 77.

- January 28, 2020. Xcel Energy sent mailers out to approximately 3,500 landowners and local officials in the project area highlighting an upcoming public open house for the Project which was scheduled for February 5-6, 2020 (see Feb 5-6, 2020 bullet for more detail). Project route option maps, an interactive map, comment form and fact sheets were posted on the project web site.
- February 5-6, 2020. Newspaper ads ran in the Ashland Daily Press (Feb 5), the Mellen Weekly Record (Feb 5) and the Hurley Iron County Miner (Feb 6) announcing that Xcel Energy was hosting a second round of public open houses on February 11th and 12 for the Ashland-Ironwood Transmission Relocation Project.
- February 10, 2020. Xcel Energy met with the Ashland County Highway Department in Highbridge, WI and provided a project update.
- February 11 and 12, 2020. 2nd round of public open houses held. Xcel Energy held three open houses to provide input on route options for relocating two 35-mile existing transmission lines between Ashland, Wisconsin and Ironwood, Michigan. Staff from Siting and Land Rights, Project Management, Vegetation Management, Engineering, Transmission Communications and Community Relations were all present to talk with attendees, answer questions and receive comments. We received about 60 comments from the open houses. We used the feedback as well as field review and detailed analysis to develop the final route segment options that were presented at the virtual open houses in December and included in our application to the PSC.
- March 24, 2020. Xcel Energy held a pre-application meeting with the PSC and WDNR in Madison, Wisconsin.
- April 21, 2020. A mailer was sent to approximately 3,500 landowners and local officials announcing that the third round of public open houses were being postponed ensuring the health and safety of area residents and our staff during the COVID-19 pandemic. As part of Xcel Energy's serious, methodical approach to the threats COVID-19 poses, including coordinating with health authorities and state and federal agencies, we said we will work with local officials and residents to determine a date for the final open houses, likely no earlier than June, to safely present the final route segments to the public.
- November 18, 2020. Xcel Energy sent a 'Save the Date' mailer out to approximately 3,500 landowners and local officials in the project area highlighting an upcoming public open house for the Project which was scheduled for February 5-6, 2020 (see Feb 5-6, 2020 bullet for more detail). Project route maps, an interactive map, photo simulations, comment form and fact sheets were posted on the project web site.
- December 1, 2020. Xcel Energy sent mailers out to approximately 3,500 landowners and local officials in the project area highlighting an upcoming virtual public meeting for the Project which was scheduled for December 10, 2020 (see Dec 10, 2020 bullet for more detail). Project route maps, an interactive map, photo simulations, comment form and fact sheets were posted on the project web site.

- December 1-3, 2020. Newspaper ads ran in the Ashland Daily Press (12/1), the Mellen Weekly Record (12/2) and the Hurley Iron County Miner (12/3) announcing that Xcel Energy was hosting a virtual open house meeting on December 10, 2020 for the Ashland-Ironwood Transmission Relocation Project.
- December 10, 2020. Third round of public open houses. Xcel Energy hosted a virtual public open house on Zoom for the Ashland-Ironwood Transmission Rebuild Project. The open house was held virtually to help ensure the health and safety of area residents and our staff during the COVID-19 pandemic.
- December 22, 2020. Met with City of Mellen council members to discuss route options around the city limits.
- January 19, 2021. Met with City of Mellen clerk and mayor to discuss route options around the city limits.
- March 17, 2021. Xcel Energy sent a 'Save the Date' mailer out to approximately 3,500 landowners and local officials in the project area highlighting an upcoming public open house for the Project scheduled for March 30, 2021 to discuss modifications to Route Option D and new Route Option E. Updated project route maps, an interactive map, photo simulations, comment form and fact sheets were posted on the project web site.
- March 30, 2021. Fourth round of public open houses held. Xcel Energy hosted a virtual public open house on Zoom for the Ashland-Ironwood Transmission Rebuild Project. The open house was held virtually to help ensure the health and safety of area residents and our staff during the COVID-19 pandemic. New Route E and modified Route D options were presented.
- 1st week in June, 2021. Xcel Energy will send mailers to landowners and key stakeholders indicating a CPCN application has been filed with the PSC.

7.1.1 Public Outreach Efforts

Refer to Section 7.1 above.

7.1.2 Description of Public Information Meetings

Refer to Section 7.1 above.

7.1.3 Public Outreach Mailings

Copies of public outreach mailings are included in Appendix J.

7.1.4 Public Comments Received

Comments received from the four public open houses are included in Appendix J. Also included within Appendix J is a spreadsheet summarizing the topics from the public comments received.

7.2 Community Issues

Xcel Energy's landowner and key stakeholder outreach opportunities in advance of the application submittal was helpful in resolving many questions and concerns and also provided the opportunity to modify route options from citizen feedback in advance of the application submittal. One landowner petition was received for some citizens not in favor of routes A and D along Highway C east of Highway 13. See Appendix F for a copy of the petition in the public comments section. In addition, the Mellen City Council provided a letter not supporting routes A, B or C through the city limits. See Appendix F for a copy of a letter received from the City of Mellen City Council.

7.3 Land Use Plans

7.3.1 Ashland County

The Ashland County Comprehensive Plan (2016), which includes the Ashland County Farmland Preservation Plan, outlines the existing land use and future development plans for Ashland County. As noted in the comprehensive plan, in 2006 approximately 94 percent of land in Ashland County was categorized as woodlands and open space (including agricultural land; Ashland County et al., 2016). Public lands (i.e., federal, tribal, state, and county lands) comprise more than half of the total land in Ashland County. About 32 percent of land in Ashland County is federal forest land (Chequamegon Nicolet National Forest), 15 percent is within the Bad River Reservation, six percent is county forest land, and two state parks (Copper Falls State Park and Big Bay State Park) comprise about 4,000 acres (less than one percent) of the total land in Ashland County. In addition, about 25 percent of land in Ashland County is wetlands. Economic development opportunities in addition to preservation of the natural environment, tourism opportunities, agricultural land, and forestry resources are the primary development goals in Ashland County. Based on review of the current and future land use maps in the Ashland County Comprehensive Plan, all five proposed routes would predominantly cross lands categorized as agricultural, woodlands, and open space (Ashland County et al., 2016). The W3351 and W3316 Removal Lines predominantly cross the Bad River Reservation, and the W3606 Removal crosses Copper Falls State Park.

The Ashland County Farmland Preservation Plan (available in Volume 3 of the Ashland County Comprehensive Plan [2016]) describes existing agricultural uses and outlines the goals and guidelines for growth, development, and preservation of farmland in the county. According to the Farmland Preservation Plan, in 2012 approximately 46 percent of land in farms was used for crops, 30 percent was used as agricultural woodlands, 17 percent was pasture and rangeland, and the remaining 7 percent was used for farmsteads, ponds, and other agricultural

infrastructure. The primary goals of the Ashland County Farmland Preservation Plan are to preserve agricultural land, guide growth and development to avoid impacts on agricultural land, preserve the county's designated cultural, scenic, and environmental resources, and provide public facilities that align with the goals of the Farmland Preservation Plan. In 2014, the Fields, Water and Woods Agricultural Enterprise Area (AEA) was established in Ashland and Bayfield counties to promote the FPP by offering tax credits to landowners who voluntarily enroll in the program. Additional details about the FPP are presented in Section 7.4.3. The Fields, Water and Woods AEA stretches across portions of northwestern Ashland County and central Bayfield County. Ashland County also established the Farmland Preservation Area which stretches diagonally across the county from the northwest to the southwest. All four proposed routes cross the Fields, Water and Woods AEA and Farmland Preservation Area. The W3351 and W3316 Removal Lines cross the Farmland Preservation Area.

The Ashland County Land and Water Resource Management Plan (2019) outlines the goals, objectives, and activities of the plan for the period between 2020 and 2029 as, "…conserving water resources, reducing non-point source pollution, improving nutrient management, and implementing adaptive conservation while supporting sustainable economic and recreational resource use in Ashland County (Ashland County Land and Water Conservation Department, 2019)." The goals, objectives, and activities in the plan influence the initiatives that will be pursued as well as provide the basis for funding those initiatives. The plan was developed by a committee comprised of the Ashland County Zoning Administrator, county staff, farmers, elected officials, and the WDNR.

In addition to the Ashland County plans, each of the six towns along the proposed routes (Gingles, White River, Marengo, Ashland, Morse, and Mellen) and the three towns along the removal lines (Ashland, Gingles, and Sanborn) have their own comprehensive plans. Similar to the overall county plans, these local land use plans focus on stewardship of the agricultural and forest resources and maintaining the natural resources of the county (Town of Gingles, 2006; Town of White River, 2006; Town of Marengo, 2006; City of Ashland, 2017; Town of Morse, 2005; City of Mellen, 2006; Town of Sanborn, 2007). Beyond recommendations that future development consider and limit negative impacts on natural resources, agricultural land, and forestry resources in Ashland County, no specific restrictions to utility corridor development are noted in the county, city, or town comprehensive plans. Xcel Energy has sited the proposed routes to follow existing roadways and cleared utility corridors, which would limit impacts on natural resources, agricultural lands, and forested areas and would therefore be in agreement with the stated goals of the comprehensive plans.

7.3.2 Iron County

The Iron County Comprehensive Plan outlines the existing land uses and future development plans for Iron County (Northwest Regional Planning Commission, 2005). According to the plan, in 2005 approximately 97 percent of land in Iron County was classified as woodlands and other natural areas and about 2 percent of land was classified as agricultural. The remaining land uses

were a mix of open space, parks and recreation areas, and residential, industrial, commercial, urban, and governmental/institutional lands, generally surrounding municipalities. Woodland areas in Iron County are privately and publicly owned; publicly owned land comprises a larger portion of woodland areas and includes natural areas, reserves, and other habitat and wildlife management areas. Economic development goals outlined in the comprehensive plan are focused on creating a pro-business environment that attracts living wage jobs while preserving the rural character and natural resources of the county. To support these goals, Iron County encourages long-range land use planning and zoning at the county and local levels that balances growth with preservation of natural resources and quality of life for rural residents. Based on review of the Iron County zoning map (2011), all four proposed routes predominantly cross the Forestry zoning district, along with smaller pockets of Agricultural and Rural Residential zoning districts.

In addition to the Iron County plan, three of the five towns along the proposed routes (Anderson, Knight, and Pence) and three of the four towns along the removal lines (Gurney, Saxon, and Kimball) have their own comprehensive plans. Similar to the overall county plan, these local land use plans focus on stewardship of forest resources and maintaining the natural resources of the county (Northwest Regional Planning Commission, 2005).

Beyond recommendations that future development consider and limit negative impacts on natural and forestry resources in Iron County, no specific restrictions to utility corridor development are noted in the county or town comprehensive plans. Xcel Energy has sited the proposed routes to follow existing roadways and cleared utility corridors, which would limit impacts to natural resources, agricultural lands, and forested areas and would therefore be in agreement with the stated goals of the comprehensive plans.

7.3.3 Bad River Reservation

The Bad River Band has an Integrated Resource Management Plan, but this plan is not publicly available. Xcel Energy is working with the Bad River Band to identify any requirements or restrictions that must be adhered to during removal of lines W3351 and W3316 from reservation lands between 2026 and 2028.

7.4 Agriculture

7.4.1 Type of Farming

Xcel Energy reviewed USGS GAP National Land Cover Data to identify agricultural lands along each proposed route segment (USGS, 2014). PSC Table 2, provided in Appendix B, presents the total acres of agricultural lands along each of the proposed routes and the removal segments. In addition to the USGS GAP data, cropland data layers from the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service were reviewed to provide additional details about the types of farms crossed by the proposed route segments, including specialty farms such as orchards, tree plantations, and cranberry bogs (USDA, 2017).

According to the USDA 2017 Census of Agriculture, 52,428 acres (7.8 percent) of the approximately 668,826 acres of land in Ashland County is used for farming operations; in Iron County, 9,200 acres (1.8 percent) of the approximately 485,229 acres of land in the county is used for farming operations (USDA, 2017). Livestock, poultry, and their products comprise a significantly larger portion of the market value of products sold compared to crops, including nursery and greenhouse crops in Ashland County ($14.9 million vs. 2.6 million, respectively). Cattle and poultry are the predominant livestock raised in Ashland County and forage, Corn, and soybeans are the predominant crops grown by acres. In Iron County, the total market value of agricultural products sold is about $6 million. However, the USDA 2017 Census of Agriculture does not provide a breakdown of the market value of products sold; the information is labeled as "(D)" which indicates it has been withheld to avoid disclosing data for individual farms. Cattle, hogs and pigs, and poultry are the top livestock raised in Iron County and forage, corn, and soybeans are the top crops grown by acres.

The amount of agricultural land, based on GAP data, is provided in Appendix B, Table 2.

7.4.2 Agricultural Practices Affected by Project

Specific agricultural practices such as irrigation systems or drainage tiles are generally not identified until we initiate the easement acquisition process with the landowner of record. To date, public outreach and meetings have not identified irrigation systems or other specific agricultural practices that could be affected by the Project. Once Xcel Energy is made aware of the existence of specific agricultural practices, they will work with the landowner to avoid or minimize impacts to these practices or make them whole if there are additional monetary burdens they might incur as a result of the Project.

7.4.3 Farmland Preservation Program (FPP)

The Project area was reviewed within the Department of Agriculture, Trade and Consumer Protection's (DATCP's) AEA interactive web mapper. AEAs, part of the FPP, are areas designated by DATCP as productive agricultural land. Landowners and/or local governments can apply to DATCP to receive this designation. Landowners within designated AEAs are eligible to enter into FPP agreements.

All routes within Ashland County are partially located within the Fields, Waters, and Wood AEA, which is approximately 39,000 acres in size. Xcel Energy has requested the FPP agreements data from DATCP to determine if any FPP agreements exist within the Project area. Xcel Energy will work with DATCP and the affected landowners to minimize impacts any the FPP agreements and to restore agricultural land to pre-construction conditions.

7.4.4 Mitigating Project Impacts In/Near Agricultural Lands

Potential construction-related impacts on agriculture will generally be short term in nature, and would primarily consist of crop losses, soil mixing, and/or soil compaction along equipment access

routes and around structure installation sites. Xcel Energy would mitigate these short-term impacts by providing compensation to producers, and by restoring agricultural lands to the extent practicable. Where appropriate, mitigation techniques such as topsoil replacement and deep tilling will be utilized.

Xcel Energy has attempted to minimize long-term impacts associated with constructing the Project across agricultural lands through careful consideration of alignment routing and individual structure siting. Much of the route in agricultural areas is sited along fence lines or between fields; others would run along public road ROW, where practicable, so the proposed structures are located along the edge of the land area used for agricultural purposes. These routing and siting practices minimize the loss of tillable land and associated interference with agricultural equipment operation. If conflicts occur, Xcel Energy will work with property owners during the real estate acquisition process to accommodate property owner needs to the extent practicable.

Prior to construction Xcel Energy will coordinate with each agricultural landowner regarding farm operation (e.g., irrigation systems, drainage tiles), locations of farm animals and crops, current farm biological security practices, landowner concerns, and use of access routes. Potential impacts to each farm property along the ordered route will be identified and where practicable, construction impact minimization measures may be implemented. Site-specific practices would vary according to the activities of the landowner/farm operator, the type of agricultural operation, the susceptibility of site-specific soils to compaction, the degree of construction occurring on the parcel, and the ability to avoid areas of potential concern.

Regarding organic farms located on the ordered route, Xcel Energy will work with the landowners to minimize potential impacts to their organic farming status due to the transmission line routing or construction. Methods to minimize impacts could include offsetting the transmission line structures from the property line so tree lines or other buffers are maintained. Additionally, construction vehicles may be cleaned prior to entering the organic farm parcels, based on input from the landowner. Further, to protect organic farms during vegetation management activities once the line is in operation, Xcel Energy does not apply herbicide within portions of an easement on which the landowner wishes not to introduce it.

7.4.5 Agricultural Impact Statement

An Agricultural Impact Statement (AIS) is generally required when a project involves the actual or potential exercise of the powers of eminent domain and if any interest in more than five acres of any farm operation may be taken (Wis. Stat. § 32.035(4)(a)). Xcel Energy has submitted the Project information to DATCP's AIS Program staff to confirm if an AIS will be prepared for the Project (see Appendix F).

7.4.6 Neutral to Earth Voltage and Induced Voltage

7.4.6.1 The number of confined animal dairy operations located within one half mile of the proposed centerline.

There is one licensed dairy served by the Applicant within 0.5-mile of the route options on Highway 77 near Mellen (see Appendix A, Figure 4). Xcel Energy will complete a drive through inspection later in 2021 or early 2022 to locate any Co-op served dairies and any other large confined animal operations. The drive through inspections are conducted with two in the vehicle for safety and efficiency; due to the added risks associated with the COVID-19 virus, the inspection was delayed.

The Applicant will offer stray voltage tests before and after the construction of the Project for all dairies and large confined animal operations within the established proximity criteria.

7.4.6.2 The number of agricultural buildings located within 300 feet of the proposed centerline.

Table 7.4-1 below provides the number of agricultural buildings and dairy operations near the construction of Routes A through E. The portions of the Project which only include removal of existing structures (i.e., the W3606, W3316, and W3351 Removals) are separated as they do not involve any new installation.

Table 7.4-1 Agricultural Buildings and Dairy Operations

Route Option	Agricultural Buildings within 300 feet	Diary Operations within 300 feet
New Installation		
Route A	16	1
Route B	22	1
Route C	13	1
Route D	15	1
Route E	11	1
Laydown Yards	1	0
Existing Line Removal		
W3606 Removal – Routes A through E [1]	0	0
W3606 Removal with Distribution – Routes A through C [2]	0	0
W3606 Removal with Distribution – Routes D and E [3]	0	0
W3316 Removal	8	0
W3351 Removal	6	0

Table 7.4-1 Agricultural Buildings and Dairy Operations			
	Route Option	**Agricultural Buildings within 300 feet**	**Diary Operations within 300 feet**
[1]	Routes A, B, C, D, and E are identical for their W3606 removal portion.		
[2]	Routes A, B, and C are identical for their W3606 removal with distribution portion.		
[3]	Routes D and E are identical for their W3606 removal with distribution portion.		

7.4.6.3 Discuss induced voltage issues as they relate to the project and routes.

Induced voltage or "stray voltage" is a condition that can potentially occur on a property or on the electric service entrances to structures from distribution lines connected to these structures - not transmission lines as proposed here. The term generally describes a voltage between two objects where no voltage difference should exist. More precisely, stray voltage is a voltage that exists between the neutral wire of either the service entrance or of premise wiring and grounded objects in buildings such as barns and milking parlors. The source of stray voltage is a voltage that is developed on the grounded neutral wiring network of a building and/or the electric power distribution system.

Transmission lines do not, by themselves, create stray voltage because they do not connect directly to businesses or residences. Transmission lines, however, can induce voltage on a distribution circuit that is parallel and immediately under the transmission line. If the proposed transmission lines parallel or cross distribution lines, appropriate mitigation measures can be taken to address any induced voltages. For additional information regarding stray voltage, please see the PSC page on Stray Voltage Guide that is available online at https://psc.wi.gov/Pages/Programs/StrayVoltageHomePage.aspx, or contact your electrical utility provider.

7.4.6.4 Farming Operations, Vehicle Use, and Metal Buildings near Power Lines

The power lines will be designed to meet or exceed minimum clearance requirements with respect to electric fencing as specified by the NESC. Nonetheless, insulated electric fences used in livestock operations can be instantly charged with an induced voltage from transmission lines. The induced charge may continuously drain to ground when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. The local electrical utility can provide site specific information about how to prevent possible shocks when the charger is disconnected.

Farm equipment, passenger vehicles, and trucks may be safely used under and near power lines. The power lines will be designed to meet or exceed minimum clearance requirements with respect to roads, driveways, cultivated fields and grazing lands as specified by the NESC. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

Vehicles, or any conductive body, under high voltage transmission lines will be immediately charged with an electric charge. Without a continuous grounding path, this charge can provide a nuisance shock. Such nuisance shocks are a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, the induced charge on vehicles will normally be continually flowing to ground unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally discouraged within the ROW itself because a structure under a line may interfere with safe operation of the transmission facilities. For example, a fire in a building on the right- of-way could damage a transmission line. As a result, NESC guidelines establish horizontal and vertical clearances for transmission facilities. Metal buildings may have unique issues. For example, conductive buildings near power lines of 200 kV or greater must be properly grounded. Any person with questions about a new or existing metal structure can contact Xcel Energy for further information about proper grounding requirements.

Xcel Energy will design and construct the proposed facilities to minimize the potential for induction issues. See Section 5.3 of this Application for locations where electric distribution lines will be relocated to eliminate physical conflicts with the Project or to increase separation with the proposed transmission line. Additionally, Xcel Energy will work with the owners of the potentially impacted facilities to address their concerns. This includes coordinating with the local distribution companies to perform pre- and post-construction testing of potentially impacted facilities, if necessary, to ensure that no adverse impacts result.

7.5 Residential and Urban Areas:

7.5.1 Discuss anticipated impacts to residential/urban neighborhoods and communities such as ROW clearance and temporary construction impacts, including noise, dust, duration of construction, time-of-day of construction, road congestion, impacts to driveways, etc. how they will be mitigated.

The proposed route options and line removals are primarily located in rural areas. However, all five route options cross the municipal boundaries of Mellen in Ashland County, and Montreal and Hurley in Iron County. The 88 kV W3351 Removal begins within the city limits of Ashland but does not cross additional municipal boundaries. The 115 kV W3316 Removal crosses the municipal boundary of Hurley. The 34.5 kV W3606 Removal also crosses the municipal boundary of Mellen. In addition, there are many rural residences along the route options and the removal areas.

The Project will be built using conventional construction equipment (e.g., bulldozers, heavy trucks, drill rigs, cranes, and hydraulic and pneumatic tools). During construction, ambient noise

levels would increase; dust may be generated by ground disturbing activities and the use of access roads; and, mud may be tracked onto public roadways at construction vehicle access points. Work will generally be completed during daylight hours under a typical 8 to 12-hour work day, unless night work is specifically required. In areas of active construction along roadways or at road crossings, lane closures may be necessary during active construction to ensure public safety.

7.5.2 Discuss how anticipated impacts would be mitigated.

Xcel Energy will mitigate construction impacts on residential areas, where possible. The Project will be constructed primarily during work hours and the noise generated during construction activities will be temporary and sporadic. Dust will be controlled by periodic wetting of access roads and work areas or by application of polymer to exposed soil. Tracking pads will be constructed at frequently used access points to minimize mud being tracked onto public roads. Road sweepers may also be used to remove mud tracked onto the road. Traffic control plans will be developed if needed and implemented during construction to minimize impacts to traffic.

Use of residential concrete or blacktop driveways will be avoided whenever possible. If access is unavoidable, the driveways may be protected using composite mats or other low-profile protection systems. Commercial or industrial driveways may be used without surface protection but will be evaluated prior to their use. Any damage caused by construction access will be repaired as needed.

7.6 Aesthetic Impacts

7.6.1 Photo Simulations

Xcel Energy created photo simulations to support and enhance stakeholders' understanding of Project impacts from a visual perspective and included as Appendix M.

7.6.2 Scenic Roads

There are no scenic byways or rustic roads in the Project area (WisDOT, 2020).

7.7 Parks and Recreation Areas

7.7.1 Parks and Recreation along the Routes

A list of parks and recreation areas that are located along the proposed routes and removal lines is presented below. A brief description of each park and recreation area follows the list.

- Ashland County
    - White River Wildlife Area – Ashland
        - Route Options A, B, C, D, and E

  - Ashland County Fairgrounds
    - Route Options A, B, C, D, and E
  - Copper Falls State Park
    - Route Option E
    - 34.5 kV Line W3606 Removal (all five Route Options)
  - Red Granite Falls Trail (within Copper Falls State Park)
    - 34.5 kV Line W3606 Removal (all five Route Options)
  - Takesson Trail (within Copper Falls State Park)
    - W3606 Removal (all five Route Options)
  - North Country Trail
    - Route Options A, B, C, D, and E
    - 34.5 kV Line W3606 Removal
    - 115 kV Line W3316 Removal
  - Three Rivers Park
    - Route Options A, B, and C
    - 34.5 kV Line W3606 Removal (Routes D and E only)
  - Ashland County Snowmobile Trails
    - Route Options A, B, C, D, and E
    - 34.5 kV Line W3606 Removal (Routes D and E only)
    - 88 kV Line W3351 Removal

- Iron County
  - Iron County Forest
    - Route Options A, B, C, D, and E
    - 88 kV Line W3351 Removal
    - 115 kV Line W3316 Removal
  - Iron County Snowmobile Trails
    - Route Options A, B, C, D, and E
    - 88 kV Line W3351 Removal
    - 115 kV Line W3316 Removal
  - Iron County ATV Trails

        - Route Options A, B, C, D, and E
        - 88 kV Line W3351 Removal
        - 115 kV Line W3316 Removal
    - Upson Town Park
        - Route Options A, B, C, D, and E
    - Gile Park on Kokogan Street
        - Route Option A
    - Hotchkiss Hideaway Campground
        - Route Options A, B, C, D, and E

White River Wildlife Area – Ashland – The White River Wildlife Area was established in 1946 to protect winter deer habitat (WDNR, n.d.). The wildlife area encompasses 1,120 acres located about 2 miles south of the Town of Ashland in northwestern Ashland County. Habitat for wintering deer has diminished over the years, but the heavily wooded area still provides habitat for many species due to its varying topography and forest successional stages. Recreation opportunities in the White River Wildlife Area include hiking, birding, fishing, hunting, trapping, wildlife viewing, and cross-country skiing. However, while the wildlife area is open for public use, there are no designated or maintained trails.

The existing W3606 34.5 kV ROW crosses the westernmost portion of the White River Wildlife Area, where it loosely parallels the CN railroad on the eastern side of Highway 13. All five proposed routes would cross the wildlife area in the same general location as the existing ROW.

Ashland County Fairgrounds – The Ashland County Fairgrounds are located in Marengo, Wisconsin (Ashland County Fair, 2020). The Ashland County Fair Association hosts the county fair at the fairground each year during the month of August. The existing Line W3606 34.5 kV ROW crosses the western edge of the fairgrounds where it parallels Railroad and Ensinger Roads. All route options would cross the fairgrounds within the existing 100-foot ROW. Additionally, Route Option C would require a paralleling new 100-foot ROW on the west side of Railroad and Ensinger Roads, which is directly across the street from the fairgrounds.

Copper Falls State Park – Copper Falls State Park is an approximately 3,068-acre park located 2 miles northeast of the Town of Mellen in northwestern Wisconsin (WDNR, n.d.). The park was created in 1929 by the Civilian Conservation Corps and the Works Progress Administration and is owned and managed by the WDNR. The highlights of this state park are its waterfalls, including Copper Falls, Brownstone Falls, and the Tyler Forks Cascades, located along the Bad and Tyler Forks Rivers as they wind through steep-walled canyons within the park. The primary management goal for Copper Falls State Park is to provide opportunities for public recreation (e.g., hiking, camping, and fishing) and to preserve the park's natural resources (Grygo, 1975).

The proposed ROW for Route Options A, D, and E occurs within Copper Falls State Park, on the north end; however, no structures are proposed on park land. In addition, the W3606 Removal crosses diagonally across the park from northwest to southeast. Within the park, the W3606 Removal crosses the Takesson Trail and Red Granite Falls Trail. In addition, off-ROW access for the W3606 Removal would cross the Blue Trail within the park.

North Country National Scenic Trail – The North Country National Scenic Trail is a 4,600-mile-long hiking trail that crosses through portions of North Dakota, Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, and Vermont (North Country Trail.org, n.d.). The authorized route of the trail was developed in the 1970s through a collaborative effort between federal and state agencies and solicitation of public input. In the 1980s, the non-profit North County Trail Association was formed to maintain, protect, and promote the National Scenic Trail.

The segment of the trail in Wisconsin is about 200 miles in length located in the northern portion of the state and crosses through Copper Falls State Park, amongst others, and Iron County Forest land. In Ashland County, all five route options and the W3606 Removal would cross the North Country National Scenic Trail area. In addition, off-ROW access for all five route options and the W3606 Removal would cross the trail. In Iron County, the W3316 Removal crosses the trail just west of Ironwood where the trail follows South Drive.

Iron County Forest –Iron County Forest is the fourth largest county forest in the state of Wisconsin and covers approximately 175,305 acres throughout Iron County (Iron County Forestry and Parks, n.d.). Numerous recreational opportunities are available on Iron County Forest land, including hunting, fishing, camping, hiking, snowshoeing, cross-country skiing, wildlife viewing, and numerous ATV and snowmobile trails. About 85 percent of the county forest is forested and timber sales are conducted twice each year.

All five route options would cross Iron County Forest land as they parallel Highway 77 between the towns of Tyler Forks and Rouse and again near the Town of Montreal. The removal segments cross Iron County Forest land in northern Iron County. In addition, off-ROW access for all five route options and use of Laydown Yard 9 during construction would affect Iron County Forest land.

ATV/Utility Task Vehicle (UTV) trails – There are numerous ATV/UTV trails in Ashland and Iron counties, most of which are on local roads. All five route options and off-ROW access for the route options have several crossings of ATV/UTV trails and, in some cases, the routes are parallel to the roads that make up the trails. In Ashland County, ATV/UTV trails near the Project loosely follow Highway 13 between Ashland and Mellen, with some areas paralleling the highway while some trails diverge from the highway to travel off-road (e.g., between Marengo and Mellen). In Iron County, ATV/UTV trails near the Project generally travel north-south along county and township roads, with some trails crossing Highway 77 but never paralleling the highway. Many of the trails are located within Iron County Forest land.

Snowmobile trails – snowmobiles trails traverse much of Ashland and Iron counties and connect cities. In Ashland County, snowmobile trails near the Project loosely follow Highway 13 between Ashland and Mellen, with some areas paralleling the highway while some trails diverge from the highway to travel off-road (e.g., between Marengo and Mellen). All five route options, off-ROW access for the route options, and the removal lines would cross snowmobile trails in Ashland County. In addition, the use of the Marengo laydown yard during construction would affect Ashland County Snowmobile Trail 16 in Ashland County.

In Iron County, snowmobile trails near the Project generally travel north-south along county and township roads, with some trails crossing Highway 77 but never paralleling the highway. Many of the trails are located within Iron County Forest land. All five route options, off-ROW access for the route options, and the removal lines would cross snowmobile trails in Iron County. In addition, the use of Laydown Yard 10 would affect Iron County Trail 7, which is used as a snowmobile trail during winter months.

Three Rivers Park – Three Rivers Park is located in the City of Mellen near the intersection of Tyler Avenue and Olson Road. The park is within the eastern limits of Mellen and has two baseball diamonds. The existing W3606 34.5 kV ROW crosses the eastern edge of the park where it parallels Olson Road. Route Options A, B, and C and the W3606 Removal (Routes D and E only) would cross the park in the same location as the existing ROW.

Hotchkiss Hideaway Campground – During the December 10th public meeting hosted by Xcel Energy, a landowner identified the Hotchkiss Hideaway Campground near the Town of Upson in Iron County. The campground is located on the north side of Highway 77, northeast of Upson and all five proposed routes would cross the campground and generally follow the existing W3607 34.5 kV transmission line, which parallels Highway 77, in the area of the campground.

7.7.2 Parks and Recreation Mitigation

Potential long-term impacts on the affected properties have been minimized primarily by utilizing Xcel Energy's existing transmission line corridor to the extent practicable and/or routing the transmission line with existing linear facilities such as roads and distribution lines. Construction of any of the proposed routes could result in some medium-term impacts, particularly in locations where trees need to be trimmed or removed. However, once the transmission line is constructed vegetation will be allowed to grow back over time.

Short-term impacts would include an increase in ambient noise. Short-term construction impacts for affected areas on the selected route would be mitigated, in coordination with the corresponding land managers, through strategic scheduling and the application of construction BMPs.

Xcel Energy met with the WDNR on March 4, 2021 to review Route Option E's crossing of the North Country National Scenic Trail area, just south of Copper Falls State Park, and discuss the W3606 Removal. For Route Option E, Xcel Energy is proposing to span the parcel to avoid any

ground disturbance in this area. For the W3606 Removal, Xcel Energy proposes to remove the existing 34.5 kV W3606 transmission line by using a helicopter to place one worker in the existing ROW to chainsaw the wood poles at ground level and haul out the poles via helicopter (see Appendix L). This method would result in no ground disturbance and Xcel Energy will work with the WDNR to develop restoration methods that may include enhancing pollinator habitat. Xcel Energy's coordination with WDNR is ongoing.

7.8 Airports

7.8.1 Location of Airports and Airstrips

There is one public airport within 5 miles of the Project. The John F Kennedy Memorial Airport is located approximately 3.5 miles west of Structure W3316-42 and south of the town of Ashland.

7.8.2 Airport/Airstrip Descriptions

The John F Kennedy Memorial Airport has two runways with dimensions of 5,197 by 100 feet oriented north/south and 3,498 by 75 feet, oriented northwest/southeast (Airnav.com, 2018). Both runways are covered with asphalt. The John F Kennedy Memorial Airport averages 29 aircraft operations per day and is predominantly used for single engine and multi engine airplanes and has fewer jet planes and ultralight aircraft.

7.8.3 Potential Construction Concerns and FAA Consultation

On May 5, 2021, Xcel Energy submitted approximate structure locations and heights to the Federal Aviation Administration (FAA) Notice Criteria Tool for nearest point (Structure W3316-42) to the airport as a preliminary screening. The Notice Criteria Tool indicated the proposed structure is in proximity to a navigation facility (John F Kennedy Memorial Airport) and may impact the assurance of navigation signal reception. Xcel Energy notes it is typical for the FAA to review any proposed structure within approximately 4 miles of a public airport, regardless of structure height. Xcel Energy does not anticipate any impacts to airports as the proposed structures will of similar height and location as existing structures in this area. An evaluation of the structures will be conducted by FAA once a route is selected and the pole designs are final. Neither the FAA nor WisDOT Bureau of Aeronautics have provided comments on the Project.

7.9 Communication Towers

Xcel Energy reviewed the Federal Communications Commission databases for registered communication towers in the Project vicinity. There are two FM towers, two microwave towers, one AM tower, and one cell tower within a mile of the five route options, all near Gile and Hurley. The closes tower is 1,275 feet from the routes. For the removal lines, there are two towers within a mile of 88 kV Line W3351 on the south side of the City of Ashland and one additional microwave tower along 88 kV Line W3351 near Cedar.

7.9.1 Discuss any potential interference to the function of communication towers within the project area by the proposed project.

No impacts on radio, television, cellular phones, or Global Positioning System units are expected from construction or operation of either of the route options. Depending on signal strength and direction, minor interference with AM radio may occur within the ROW along each route. The routes have been developed to provide an adequate distance from any of these towers or facilities during the initial routing process to avoid potential safety or quality issues.

7.9.2 Community Income from High-Voltage Transmission Impact Fees

High-Voltage Transmission Impact Fees do not apply to this Project because the voltage of the proposed lines is up to 161 kV. Wis. Stat. § 16.969(1)(b) defines a high-voltage transmission line subject to the fees as one designed for operation at a nominal voltage of 345 kV or greater.

8.0 WDNR PERMITS AND APPROVALS FOR IMPACTS TO WATERWAYS AND WETLANDS

WDNR permit authorizations for impacts to wetlands and navigable waterways will be required for this Project, including:

- Chapter 30 permit to place temporary clean span bridges across navigable waters, pursuant to Wis. Stat. § 30.123 and Wis. Admin. Code ch. NR 102 and 320;
- Wetland Individual Permit, pursuant to Wis. Stat. § 281.36 and Wis. Admin. Code chs. NR 103 and 299; and
- Any other applicable permit and/or approval which is required.

The documentation required by WDNR to review the Project in consideration of the above-referenced permits is provided in the following section of the Application, as stipulated in Wis. Stat. § 30.025. Also included in Appendix B are Table 8 – WDNR Waterway/Wetland Impact Location Table and Table 9 – WDNR Waterway/Wetland Inventory Table.

A Construction Site Stormwater general permit under NR 216, Wis. Admin. Code, would be filed after and if a route is ordered and prior to construction of the Project. If an Incidental Take permit is required, additional information will be submitted to WDNR Natural Heritage Conservation Program prior to construction. Any other applicable permits and/or approvals will be obtained all applicable regulatory agencies prior to construction (see Table 1.7-1).

Temporary Bridges

Temporary bridges will be required for construction access over navigable waterways for each route. The number of TCSBs proposed are (see Appendix B Table 8):

- Route A – 108 TCSBs
- Route B – 125 TCSBs
- Route C – 113 TCSBs
- Route D – 102 TCSBs
- Route E – 98 TCSBs

The removal portions of the Project (i.e., the W3606, W3316, and W3351 Removals) are anticipated to be removed via helicopter; therefore, no TCSBs are proposed for those pole removals.

These crossings require approval by the WDNR under Wis. Stat. § 30.123. It is anticipated, based on desktop and field review, that all of the waterways proposed for TCSB installation are less than 35 feet wide and will be designed to meet the standards and conditions for TCSB crossings in Wis. Admin. Code § NR 320.06. The requirements in Wis. Admin. Code § NR 320.04(3), will be

followed for those crossings that do not meet the 5 feet of navigation clearance standard in Wis. Admin. Code § NR 320.04.

Xcel Energy will provide additional data regarding site-specific conditions at each waterway for each proposed bridge crossing location if necessary.

A WDNR mapped waterway is located within the boundary of Laydown Yard #10. If the waterway is determined to be navigable by the WDNR, the laydown yard boundary will be modified to avoid any impacts to the waterway.

Discharges to Wetlands

Transmission structures to be placed in wetlands are summarized in Section 6.3.2. The proposed locations are specified in Appendix B, Table 8 for each route, and the wetlands are depicted in Appendix A, Figure 5. Placement of fill in wetlands, including the temporary fill resulting from the placement of protective construction matting, will require approval under Section 404 of the Clean Water Act (CWA) from the USACE, Water Quality Certification from the WDNR under Section 401 of the CWA, Wis. Stat. §§ 281.15, 281.31 and 281.36, and Wis. Admin. Code ch. NR 299. The amount of wetland fill proposed is as follows (also see Appendix B Table 8):

- Route A – 85 acres of temporary wetland fill from construction matting, 0.19 acres of permanent wetland fill from new pole structures, and 158 acres of forested wetland conversion.
- Route B – 93 acres of temporary wetland fill from construction matting, 0.20 acres of permanent wetland fill from new pole structures, and 167 acres of forested wetland conversion.
- Route C – 80 acres of temporary wetland fill from construction matting, 0.17 acres of permanent wetland fill from new pole structures, and 133 acres of forested wetland conversion.
- Route D – 82 acres of temporary wetland fill from construction matting, 0.18 acres of permanent wetland fill from new pole structures, and 145 acres of forested wetland conversion.
- Route D – 86 acres of temporary wetland fill from construction matting, 0.18 acres of permanent wetland fill from new pole structures, and 192 acres of forested wetland conversion.

Several laydown yards are located within wetlands. The Project's laydown yards were not field evaluated; therefore, wetlands were mapped via desktop resources only and have not been field verified. Field verification only occurred where a portion of the laydown yard (yards 2 and 9) overlapped the Project ROW corridors. Until field surveys occur within the laydown yards to verify desktop resource mapping, potential wetland impacts from the use of these laydown yards is presented in Appendix B, Table 8 as the temporary use of gravel. There is anticipated to be up to 34 acres of temporary wetland fill in the Project's laydown yards.

It is anticipated that a helicopter will be utilized to remove the existing pole structures along lines W3316 and W3351, and along the portion of line W3606 that is being removed adjacent to and within Copper Falls State Park. As such, wetland and waterway impacts from access for pole removal are not included in Appendix B, Table 8.

8.1 WDNR Tables for Wetland and Waterways

As described in Section 8.0, a WDNR Waterway/Wetland Impact Location Table (Table 8) and a Waterway/Wetland Environmental Inventory Table (Table 9) are provided for each route in Appendix B. In addition to wetlands and waterways encountered along each route, Table 2 also includes upland natural communities which are referenced in other sections of the Application (i.e., Section 6.1 – Forested Lands, and Sections 6.5 and 9.0 which are related to Endangered Resources and Natural Communities).

8.2 Wetland Practicable Alternatives Analysis (Wis. Admin. Code Ch. NR 103)

During route selection, environmental and other factors were evaluated along all potential routes as described in Section 5.1. Through this evaluation, the proposed routes were identified for further evaluation and refinement. Proposed alignments along these routes were also determined through the consideration of these factors.

The number of structures preliminarily determined to be placed in wetlands represents a conservative estimate based on the conceptual pole locations and is detailed by wetland location in Appendix B, Table 8 – WDNR Waterway/Wetland Impact Location Table. Prior to construction, Xcel Energy will attempt to further minimize wetland impacts in the final design.

Access through wetlands will be minimized to the extent practicable, and the use of heavy equipment in wetlands will also be minimized to the extent practicable. When wetland access is required, as described in Section 6.3, disturbance to wetlands will be reduced by one or more of the following: completing wetland construction during dry or frozen conditions; the use of equipment with low ground pressure tires or tracks; placement of construction matting to help minimize soil and vegetation disturbances; distributing axle loads over a larger surface area thereby reducing the bearing pressure on wetland soils; or the use of ice roads.

Upon completion of the transmission line, Xcel Energy will complete site restoration and revegetation consistent with the activities described in Section 6.9.

It is not anticipated that the placement of construction matting in wetlands would exceed 60 consecutive days within the growing season.

8.2.1 Describe how wetlands were factored into the corridor and route/site selection process.

Xcel Energy factored wetland avoidance into the Project corridor and route selection process to the extent practicable in the early planning stages including eliminating the existing W3351 and W3316 corridors as route options because of the significant presence of wetland known on prior field inspections and using WWI data. Xcel Energy also conducted wetland determinations in the field to support the PSC and WDNR application process as well as engineering during the route planning stage to avoid wetlands where feasible while identifying preliminary pole spotting locations for the five route options. In addition, potential wetland impacts were taken into consideration along with other environmental and social impacts, input from the preceding open houses, engineering feasibility, and cost as described in Section 5.

8.2.2 Describe how the location of proposed routes/sites and design of the line/project avoids and minimizes wetland impacts including consideration for placing structures outside wetlands. Explain how proposed access routes will avoid or minimize wetland impacts.

The proposed route segments have been selected to avoid and minimize wetland impacts to the extent practicable. However, given the structure spanning requirements, wetland impacts cannot be completely avoided by either route. Based on standard design elements, transmission structures will typically span about 200 to 300 feet. This distance is dependent upon several factors, including topography and ROW constraints which can restrict Xcel Energy's flexibility to completely avoid structure placement in wetlands. Many of the routes are collocated with existing linear corridors, which can reduce wetland conversion impacts associated with the Project. However, those areas that are collocated are also limited in avoiding wetlands in some cases, in that shifting the route to avoid a wetland could potentially cause other impacts such as additional forest fragmentation or landowner encroachment.

The number of structures preliminarily determined to be placed in wetlands represents a conservative estimate based on the conceptual pole locations, as discussed in Section 6.3, and is further detailed by wetland in Table 8 of Appendix B.

Upon route approval, Xcel Energy will attempt to further minimize wetland impacts in the final design. For example, where possible, efforts will be made to move structures near a wetland edge to outside of the wetland. However, based on the number and extent of wetlands along each route, complete avoidance of wetlands may not be practicable.

Access through wetlands will also be minimized to the extent practicable. For example, if construction occurs during periods when the ground is not frozen or dry, wetlands occurring along most roads will be accessed from the adjacent roads near the structure location. If practicable, this will eliminate the need for heavy equipment to access through the entire length of the wetland.

8.2.3 For proposed construction that will impact wetlands, detail why project alternatives are not practicable after taking into consideration cost, available technology, and logistics in light of overall project purpose.

The purpose of the Project is to improve electric reliability to communities in northern Wisconsin. A number of factors were considered during the routing process including, but not limited to the following:

- Cost - relative to wetland avoidance.
- Available technology - materials and construction methods that can be employed to minimize impacts on wetlands for example.
- Logistics - weighing wetland avoidance with factors such as proximity to homes and other buildings, regulation-based design, and benefits of collocation.

However, complete avoidance of wetlands is not feasible due to the frequency of occurrence and number of line miles for this Project. Therefore, Xcel Energy was unable to identify a practicable alternative that would entirely avoid wetland impacts.

8.2.4 If wetland impacts cannot be avoided, describe all temporary and permanent impacts, as well as the construction and restoration methods that would be used to minimize wetland impacts.

During construction, the implementation of BMPs and Xcel Energy's standard environmental protection practices will provide for further avoidance and minimization of wetland impacts. Through careful attention to access routing, consideration of off-ROW access, types of equipment used, construction time of year, sedimentation control, and the implementation of other relevant site-specific measures, Xcel Energy will mitigate impacts to important wetlands, to the extent practicable in each case. Where minor impacts such as rutting and vegetation disturbance due to equipment operation and mat placement in wetlands, site restoration activities will be implemented, monitored, and remedial measures applied (as necessary) until established restoration goals are achieved.

Regardless of the route selected, construction will result in 0.20 acres or less of permanent loss of wetlands along the length of the Project (total area of foundations or structures, and backfill). There will also be forested wetland conversion; however, as previously mentioned fragmentation of undisturbed wetlands will be minimized due to the collocation of the routes with existing linear features. In areas where additional ROW is needed, the adjacent lands will be cleared of trees and other woody vegetation, resulting in a conversion to emergent or scrub-shrub wetland types. Compensatory mitigation options that meet regulatory requirements will be developed in coordination with the appropriate agencies.

8.3 Wetland Delineations

As discussed in Section 6.3, this Application is presented using a combination of data collected by field wetland determinations conducted in May and June 2019, in addition to conservative desktop mapping. Xcel Energy conservatively assumed areas where hydric or partially soils exist are wetland for locations where field survey was not completed.

8.4 Mapping Wetland and Waterway Crossings

The maps included in Appendix A, Figure 5 include the required information for mapping wetland and waterway crossings as listed below.

8.4.1 Recent aerial photo

8.4.2 Transmission line

8.4.3 ROW

8.4.4 Pole locations - Label each pole by number if appropriate.

8.4.5 Waterways

8.4.6 Wisconsin Wetland Inventory

8.4.7 Delineated wetlands

8.4.8 Hydric soils

8.4.9 Proposed temporary bridge locations (labeled to correlate with WDNR Table 1 (referred to in this Application as Table 8))

8.4.10 Locations for other Chapter 30 activities such as grading or riprap (labeled to correlate with WDNR Table 1 (referred to in this Application as Table 8)).

Note that a combination of methods was utilized to identify the presence and boundaries of wetlands (as discussed in Sections 6.3 and 8.3) and waterways. All wetlands and waterway identified via these methods are included in Appendix A, Figure 5. The naming convention utilized in Figure 5 is summarized in Table 8.4-1.

Table 8.4-1 Naming Convention Utilized for Wetlands and Waterways

Identification Method	Naming Convention - wetland	Example - wetland	Naming Convention - waterway	Example - waterway
Field survey	Begins with “w”	w-001-b	Begins with “s”	s-001-b
Conservative desktop - WWI	Begins with “WWI”	WWI_005	N/A	N/A
Conservative desktop – NRCS hydric soils	Begins with “HS”	HS_192	N/A	N/A

Table 8.4-1 Naming Convention Utilized for Wetlands and Waterways

Identification Method	Naming Convention - wetland	Example - wetland	Naming Convention - waterway	Example - waterway
Conservative desktop – 24K hydrology	N/A	N/A	Begins with "WI_24K"	WI_24K_089

To easily identify the locations of wetland clearing, Figure 5 combines different wetland types into 2 categories: Forested Wetlands and Non-Forested Wetlands. Shrub type wetlands are included in the Non-Forested Wetland category. The exception to this is WWI wetland polygons that are a combined shrub/forested type were included within the Forested Wetland category.

9.0 ENDANGERED, THREATENED, SPECIAL CONCERN SPECIES AND NATURAL COMMUNITIES

As noted in Section 6.5.1, ER Reviews haves been approved by the WDNR, and a public (redacted) version is provided in Appendix H.

9.1 WDNR-Endangered Resource Review

As noted in Section 6.5, ER Reviews was approved by the WDNR with required and recommended actions for various species (log #'s 18-315, 21-275, and 21-276). Due to confidentiality requirements of NHI data, Xcel Energy has provided the approved ER Reviews to the PSC under separate and confidential filing.

9.2 Maps and Data Files Showing NHI Occurrences

The ER Reviews discuss the NHI element occurrence records. These records are based on a query of the NHI database completed in March 2021.

9.3 Assessment and Biological Surveys for Proposed Routes

At this time, Xcel Energy does not propose to conduct biological surveys. However, if ongoing consultations with applicable state and federal agencies indicate surveys are required, Xcel Energy will work with those applicable agencies to complete the required surveys.

10.0 DNR Guidance Information

10.1 DNR Guidance for Erosion Control Plans

DNR Guidance Information is discussed in section 12.1.

11.0 DNR Guidance for Materials Management Plans

11.1 Materials Management Methodology

DNR Guidance for Materials Management Plans is discussed in section 12.1.

12.0 DNR Guidance for Dewatering Plans

12.1 Materials Management Methodology

A Construction Site Stormwater general permit under NR 216, Wis. Admin. Code, addressing sediment and erosion control would be filed to WDNR after a route is ordered, if the project is approved by the PSC, and prior to construction of the Project. It is anticipated that construction dewatering, if required, will be reviewed and approved under the Construction Site Stormwater

general permit. Management of solid waste, if applicable, will comply with requirements under NR 500 series, Wis. Admin. Code. Management of hazardous waste, if applicable, will comply with requirements under NR 600 series, Wis. Admin. Code.

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